Darlington:
Sustainable Travel
Demonstration Town

Travel Behaviour Research

Baseline Survey 2004

Report

for

Darlington Borough Council

February 2005

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1   Executive Summary

This travel behaviour research was conducted in 2004 to obtain information on how people in Darlington travel and on the reasons for their mode choice. The analysis determines the potential for reduction of car use and for an increase of sustainable travel modes (public transport, cycling and walking).

The behavioural data gives a representative picture of day-to-day travel patterns of residents of the Darlington urban area. On an average day people make 3.0 trips with 5.3 legs, performing 1.7 out-of-home activities. Per day they spend almost one hour (57 minutes) travelling per person covering an average distance of 22 kilometres.

The travel behaviour of most people is quite simple: 40 % of all people have just one journey per day with only one out-of-home activity. More than three quarters (77 %) of all journeys are just for one activity. In total 84 % of all trips start from home or lead back to home. Only 16 % of all trips are between two out-of-home destinations.

Leisure accounts for nearly one third of all trips made by Darlington residents (31 %), shopping nearly for one quarter (24 %) and travel to work for one fifth (20 %). Travel to school or college accounts for 10 % of all trips.

On an average day a quarter of trips made by Darlington residents is on foot (ie a genuine walking trip), while just 1 % is made by bicycle. Motorised private modes (car as driver or passenger, motorbike) account for almost two thirds of all trips; the majority of these trips is made by car as driver (41 %). Travel by car as passenger accounts for about one fifth of all trips (21 %) and less than 0.5 % are trips with a motor-bike. Public transport is used for 12 % of all trips.

A more detailed analysis of the use of different travel modes shows that:

- Walking trips are more common on week days than on the weekend, for education trips and among younger and not employed people. By contrast the share of walking trips is low on the journey to work and among employed men.

- The mode share of car driver trips is highest on work, work-related business and escort trips, and among employed men. (68 % of all their trips) Employed women also frequently use the car as driver (50 % of all their trips).

- Public transport in Darlington is used mostly for education and shopping trips (the latter especially to the town centre). Not employed, retired and younger people use public transport more than average.

The research also reveals the importance of short, local trips:

- Around one fifth of all trips (21 %) by Darlington residents are no further than one kilometre and nearly half (47 %) of all trips are no longer than three kilometres. Almost three quarters of trips (74 %) are in the range of five kilometres and another 10 % are between 5.1 and 10.0 kilometres. Only one sixth of all trips are longer than ten kilometres.

- On more than three quarters (77 %) of all their trips Darlington residents remain within the Darlington urban area, (ie the trips begin and end in the town). The average distance of these trips is about 3 kilometres.

- Despite this, the town centre is the destination or starting point for only 14 % of all trips made by Darlington residents. The share of public transport for trips to or from the town centre is much higher than for all trips (32 % compared to 12 %). This share is even higher for shopping trips to or from the town centre (39 %).

The analysis also shows how much, why and where cars are used by Darlington residents for their daily travel needs:

- Three out of four privately owned cars in Darlington (77 %) are used at least once a day.

- Each car is used for an average of 2.5 trips with a total duration of 42 minutes per day. The average distance covered for everyday car trips (excluding commercial and long-distance trips) is 25 kilometres per day, and each car is occupied by an average of 1.5 people per trip (including the driver).

- Nearly a third of all car trips by Darlington residents (29 %) are no longer than 3km and two thirds were within the town.

- Of those car trips within the town, over half (56 %) were for shopping and leisure purposes and a quarter for work.

The in-depth study shows that nearly all residents recognised an increase in car traffic in Darlington in the last few years, and the majority perceived this negatively. In the case of traffic planning conflicts between the car and sustainable travel modes a large majority of residents would support measures for public transport use, three out of four would support measures for cycling and more than four out of five would support measures for pedestrians.

Public transport in Darlington is considered to be important for the town's residents, and a majority agreed that more improvements should be carried out. The promotion of sustainable travel modes was considered by six out of seven to be a priority in transport policy/planning.

The research was also conducted by "reality checking" the alternative travel options for every trip recorded in the travel diary surveys. This analysis was supported by follow-up interviews identifying the awareness, perception and choice barriers currently preventing individuals from using real alternatives.

The analysis reveals that in principle significant shifts in travel behaviour are possible, for example:

- Seven out of ten of all trips could be undertaken by sustainable travel modes; or

- Around four out of five trips could be made by motorised private modes.

The current travel patterns in Darlington show that 62 % of all trips are made by car (as driver or passenger) and 38 % by the alternatives (walking, cycling and public transport).

The in-depth research also showed that more than half of current car trips within Darlington are in principle replaceable by sustainable travel modes as follows:

- a quarter by public transport,

- a third by cycling and

- a fifth by walking.

Lack of information and poor perceptions of service quality were among the most important barriers against greater public transport use. Likewise there were no constraints or subjective barriers preventing a significant proportion on car trips from being switched to walking or cycling.

This demonstrates that Darlington's Town on Move programme, by focusing on soft measures (ie information, motivation etc) has the potential to unlock significant shifts towards use of sustainable travel modes.

## *2*	*Introduction*

### *2.1*	*This report*

This report has been prepared for Darlington Borough Council by *Socialdata* and Sustrans. It reviews the findings of the travel behaviour research programme conducted in Darlington from September – December 2004 as part of Darlington Borough Council's Sustainable Travel Demonstration Town Programme.

The research was divided into two main components, firstly a travel behaviour survey (net sample 4,269 people) across the 20 urban wards of Darlington and secondly a programme of in-depth interviews with a sub-sample of 406 people covering perceptions and attitudes and potentials for behaviour change. A detailed descriptions of the methodology used is given in the research field report (Annex 4).

The main body of data arising from the travel behaviour survey are presented in a series of tables in Annex 1. Section 3 provides charts for the key behavioural data with a commentary on each. The initial findings of the in-depth research are presented in Sections 4 and 5.

### *2.2*	*Further analysis*

Given the scope and volume of data provided by this research programme, there are numerous possibilities for further analysis. *Socialdata* and Sustrans are keen to work with Darlington Borough Council to gain best value for its 'Town on the Move' programme from this rich source of data. Further graphics may be produced from the behavioural data tables following discussion with the client. The behavioural data provides a resource which many be used for a variety of special analyses a the need arises during the programme.

Following discussion with client of the data in this report, *Socialdata* will further analyse the in-depth data by using a micro-simulation technique to determine in more detail the potential for changes and the role of each sustainable mode.

3　Travel behaviour

3.1　Introduction

The data in the following charts provide a representative picture of day-to-day travel patterns of residents in the Darlington urban area[1] (excluding commercial and freight traffic, and trips over 100 km[2]). Full data tables are provided in Annex 1.

3.2　Basic Travel Characteristics

The basic travel characteristics of Darlington residents are summarised in Figure 3.1. On an average day of the week a person makes 3.0 trips consisting of 5.3 legs in total, performing 1.7 out-of-home activities[3]. Each person spends almost one hour (57 minutes) per day travelling, covering an average distance of 22 kilometres.

Figure　3.1:　Basic travel characteristics

BASIC TRAVEL CHARACTERISTICS

- Darlington -

All days	Per person/day	Workdays
1.7	ACTIVITIES	1.8
57'	TRAVEL TIME (min)	61'
3.0	TRIPS	3.1
5.3	LEGS	5.3
22	DISTANCE (km)	22

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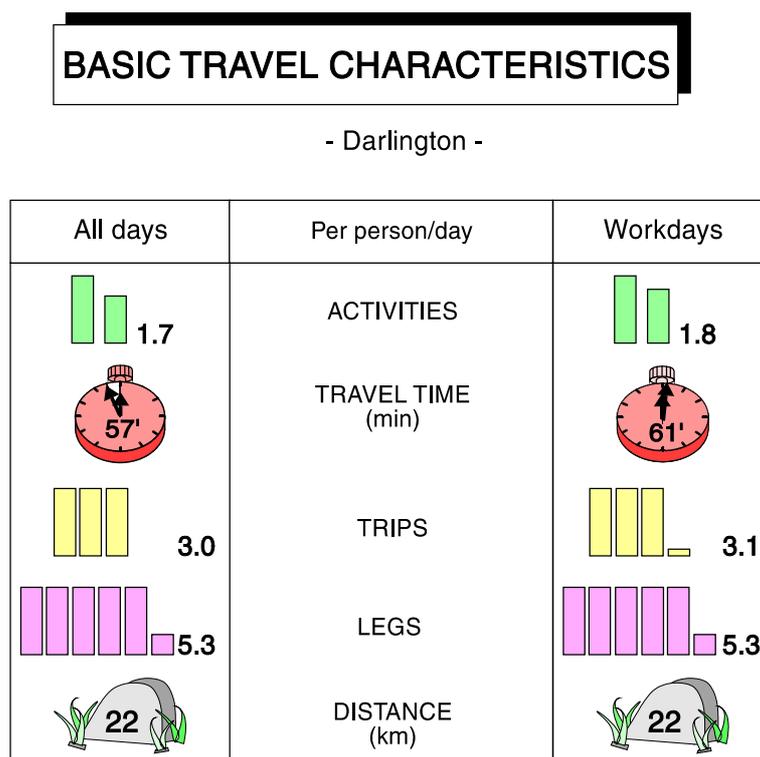
[1] The survey covered the 20 electoral wards in the urban area of Darlington.
[2] The analysis of day-to-day mobility excludes trips of more than 100 km (around 2 % of all trips) to avoid skewing any distance-related indicators.
[3] A glossary of terms is in Annex 2.

Comparing these results for all days with those for week days (Monday to Friday) it becomes obvious that on week days people make more trips, perform more activities and spend longer travelling than on the average of all days whereas the distances travelled are roughly the same.

Figure 3.2 show the number of activities and journeys[4] undertake per person per day. On an average day about six out of seven Darlington residents undertake some kind of travel (meaning that the share of mobile persons in Darlington is 86 %).

Figure 3.2: *Journeys and activities per person*

JOURNEYS AND ACTIVITIES PER PERSON

- Darlington -

Activities per person	Journeys per person					Total
	0	1	2	3	4+	
0	14					14
1		40				40
2		8	15			23
3		3	4	4		11
4+		3	4	3	2	12
Total		54	23	7	2	86

The travel behaviour of most people is quite simple: 40 % of all people make just one journey per day with only one out-of-home activity, 8 % make one journey with two activities, 3 % with three activities and another 3 % with four or more activities. Together 54 % of all people leave home only once in a day. About a quarter of Darlington people leave home twice a day (23 %), most of them (15 %) only for two activities (one per journey).

Therefore two out of five people perform only one out-of-home activity per day, another 23 % perform two activities, 11 % three activities and 12 % four or more activities.

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[4] Defined as a sequence of trips starting and ending at home.

The relationship between journeys and activities is explored further in Figure 3.3. More than three quarter (77 %) of all journeys are just for one activity. Most of them lead from home to a leisure activity and back home (24 %). Another fifth (19 %) of all journeys just leads to one shopping activity and back home and 17 % is for going to work and returning back home with no in-between activity.

Figure 3.3: Journeys and activities
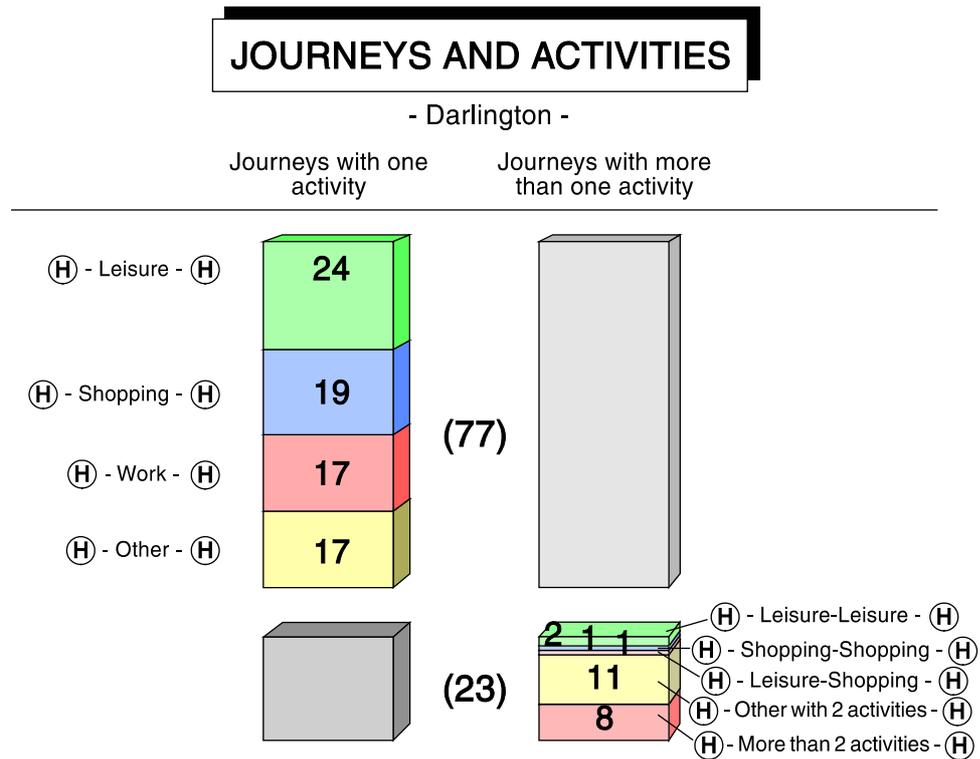
23 % of all journeys are for more than one activity, 15 % for two activities and another 8 % for three or more activities. The most common combinations consist of leisure and shopping activities.

Figure 3.4 focuses on home-related trips. In total five out of six (84 %) trips start or finish at home. Only one out of six (16 %) trips is between two out-of-home destinations.

Figure 3.4:   Home-related trips
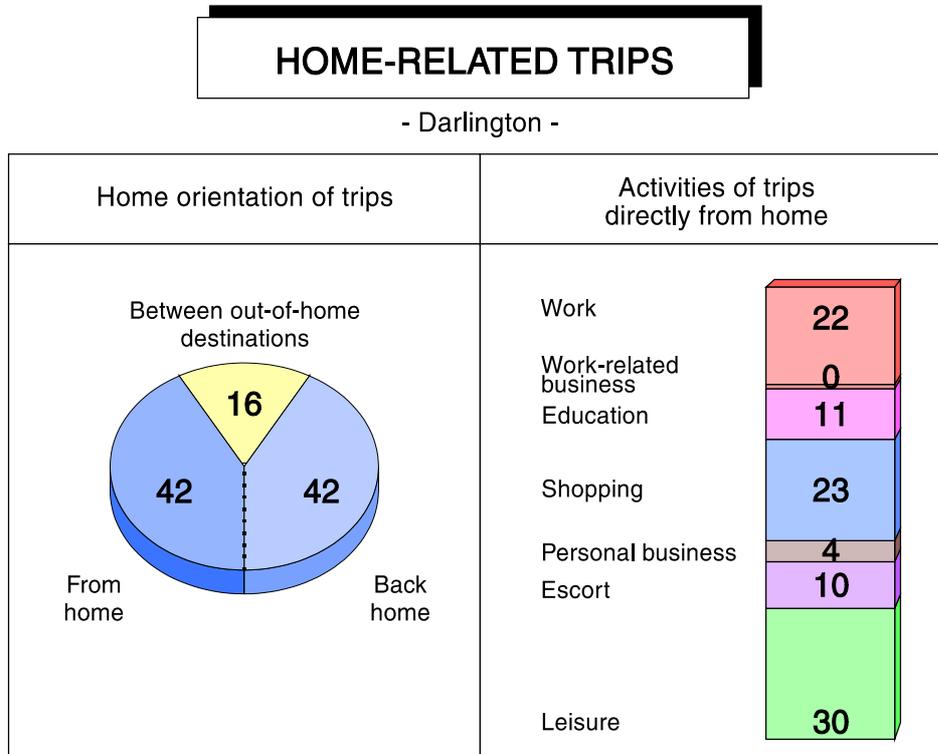
About one in five (22 %) of the trips directly from home is work-related, 11 % education, 23 % shopping, 4 % personal business (for example post office, doctor), 10 % escort and 30 % for leisure activities.

The distance range of trips from home for different purposes is shown in Figure 3.5. About four out of five (82 %) workplaces are reached by a trip starting from home. 10 % of these work places (with the trip starting from home) are within a maximum distance of one kilometre, 30 % are not further than three kilometres, 57 % not further than five kilometres and only 31 % lead to a distance of more than 10 kilometres.

Figure 3.5:   Home orientation and activities

HOME ORIENTATION AND ACTIVITIES

- Darlington -

- Distances from home -
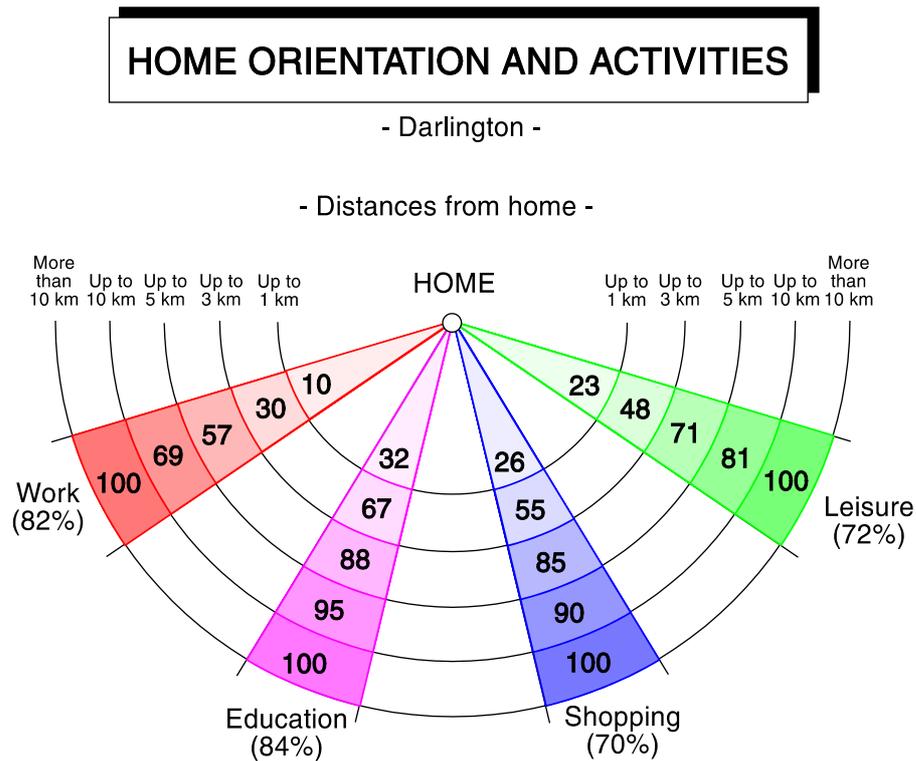
A similar proportion of education trips (82 %) also start at home, but activities like school, college and university are within a shorter distance from home: one third of these activities are in a range of one kilometre, two thirds in a range of three kilometres.

About three quarters of shopping (70 %) and leisure destinations (72 %) are reached directly from home. Most of these destinations are within a short distance from home: about one quarter is in a distance of one kilometre, about half are in range of three kilometres and only every tenth shopping destination and every fifth leisure destination is in a distance of more than ten kilometres.

Figure 3.6 shows the activities at different times of the week, and in total. Activities are the trigger for trips. As a general rule trips can be grouped into three main purposes: those that are predetermined, such as going to work or school; those that are more discretionary, such as shopping and personal business (for example post office, doctor) and thirdly, leisure activities.

Leisure accounts for nearly one third of all trips made by Darlington residents (31 %), shopping for nearly one quarter (24 %) and travel to work for one fifth (20 %). Travel to school, college and university accounts for 10 % of all trips.

Figure 3.6:   Activities by day of the week

ACTIVITIES BY DAY OF THE WEEK

- Darlington -

Total		Workdays	Saturday	Sunday
20	Work	24	8 1 1	6 0 1
3	Work-related business	4		21
10	Education	13	42	1
24	Shopping	21		5
3	Personal business	4	3	5
9	Escort	11		
31	Leisure	23	40	66
100	Share of all activities	74	14	12
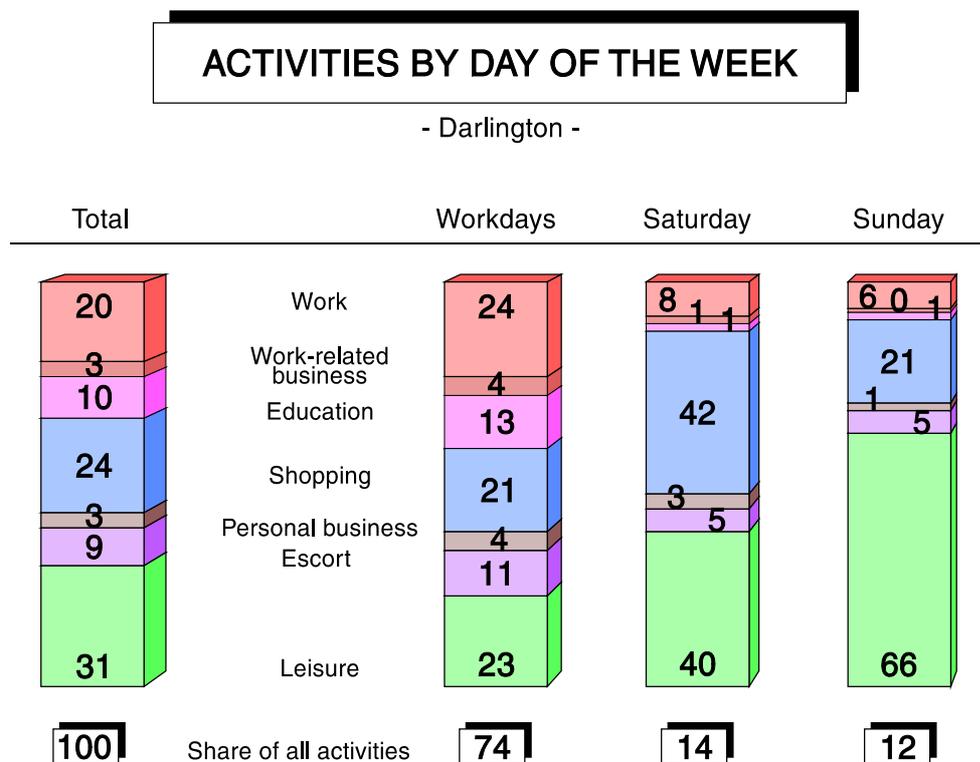
On workdays the share of regular or predetermined activities such as work and education is larger than on an average day whereas the share of leisure is smaller.

On Saturdays most people go shopping (42 %) or have leisure activities (40 %) and on Sundays the share of leisure activities reaches two thirds of all activities.

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3.3 Mode choice

Figure 3.7 shows the proportion of trips made by Darlington residents by different modes. On an average day (including the weekend), a quarter of trips is made on foot (i.e. a genuine walking trip), while just 1 % is made by bicycle.

Motorised private travel modes (e.g. car, motorbike) account for almost two thirds of all trips; the majority of these trips are made by car as driver (41 %). Travel by car as passenger accounts for about one fifth of all trips (21 %) and less than 0.5 % are trips with a motorbike.

Public transport is used for 12 % of all trips.

Figure 3.7: Mode choice by day of the week

MODE CHOICE BY DAY OF THE WEEK
- Darlington -

	Total		Workdays	Saturday	Sunday
Walking	25		27	19	20
Bicycle	1		2	1	1
Motorbike	0		0	0	0
Car as driver	41		41	40	40
Car as passenger	21		17	28	32
Public transport	12		13	12	7
Share of all trips	100		74	14	12
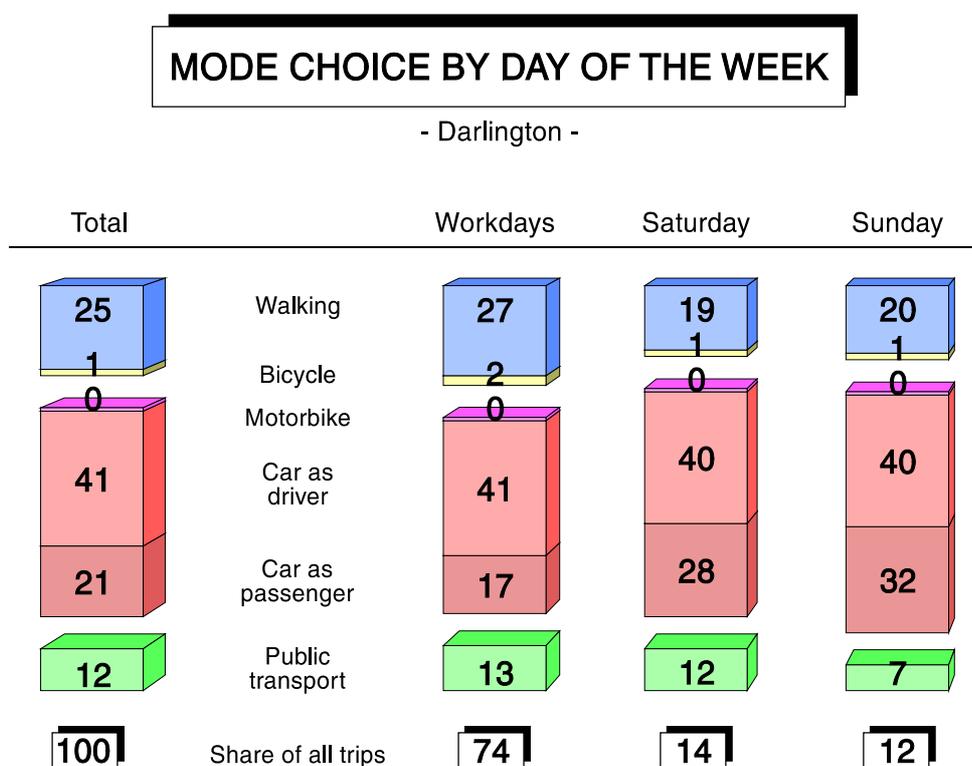
From Monday to Friday (week days) the share of walking trips, bicycle and public transport is higher than on Saturday or Sunday.

On Saturdays the share of trips travelled by car as passenger increases to 28 % and on Sundays up to 32 % of all trips.

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The share of different travel modes by trip purpose is shown in Figure 3.8. Almost two thirds (62 %) of all trips to work are conducted in a car as driver, 14 % by walking, 3 % cycling, less than 0.5 % by a motorbike, 11 % in a car as passenger and one in ten (10 %) work trips is by public transport.

The trips with the highest levels of car use are work-related business trips with six out of seven (85 %) trips by car as driver.

Sustainable travel modes dominate education-related trips: almost half of them are genuine walking trips (46 %), 1 % is by bicycle and a fifth by public transport. Only 3 % of education trips are by car as driver, 30 % as passenger in a car.

Figure 3.8: Mode choice by trip purpose
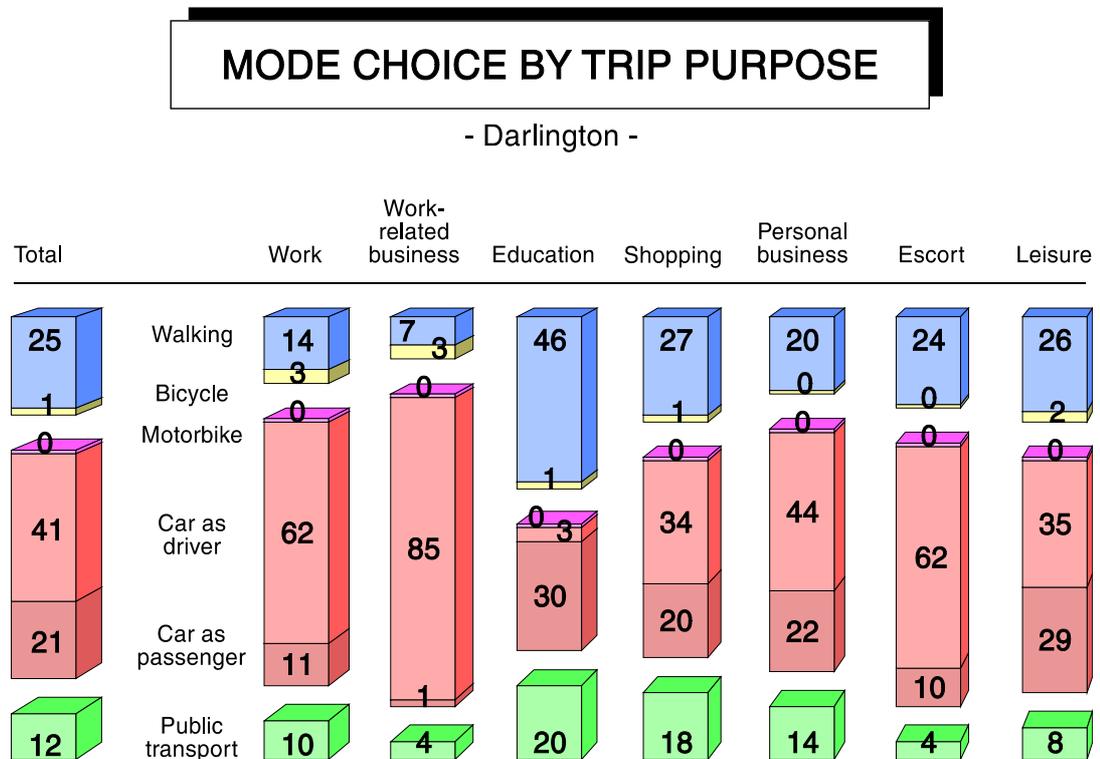
More than a quarter of shopping trips is made entirely on foot (27 %), one third by car as driver (34 %), one fifth by car as passenger and one sixth by public transport (18 %). Personal business trips show higher levels of car use than the average trip. Most escort trips are made by car as driver (62 %) or by walking (24 %).

Finally, nearly two-thirds of leisure trips are made by car, with nearly half of these as passenger – a larger share as the main mode (29 %) than most other trip purposes.

The variation of mode choice by employment status is shown in Figure 3.9. Children not yet at primary school mostly use walking (39 %) and car as passenger (57 %) for their trips. Young people going to school, college or university use public transport for 16 % of their trips . Also the share of walking (34 %) and car as passenger (43 %) is above average.

Figure 3.9: Mode choice by employment

MODE CHOICE BY EMPLOYMENT

- Darlington -

Total		Not yet at primary school	At school, college, university	Not employed	Retired/ pensioner	Employed women	Employed men
25	Walking	39	34	37	25	23	15
1	Bicycle				1	1	3
0	Motorbike	1	3	1	0	0	0
41	Car as driver		0 4	0	39	50	68
				35			
			43				
21	Car as passenger	57		10	17	17	8
12	Public transport	3	16	17	18	9	6
100	Share of all trips	5	17	9	19	25	25
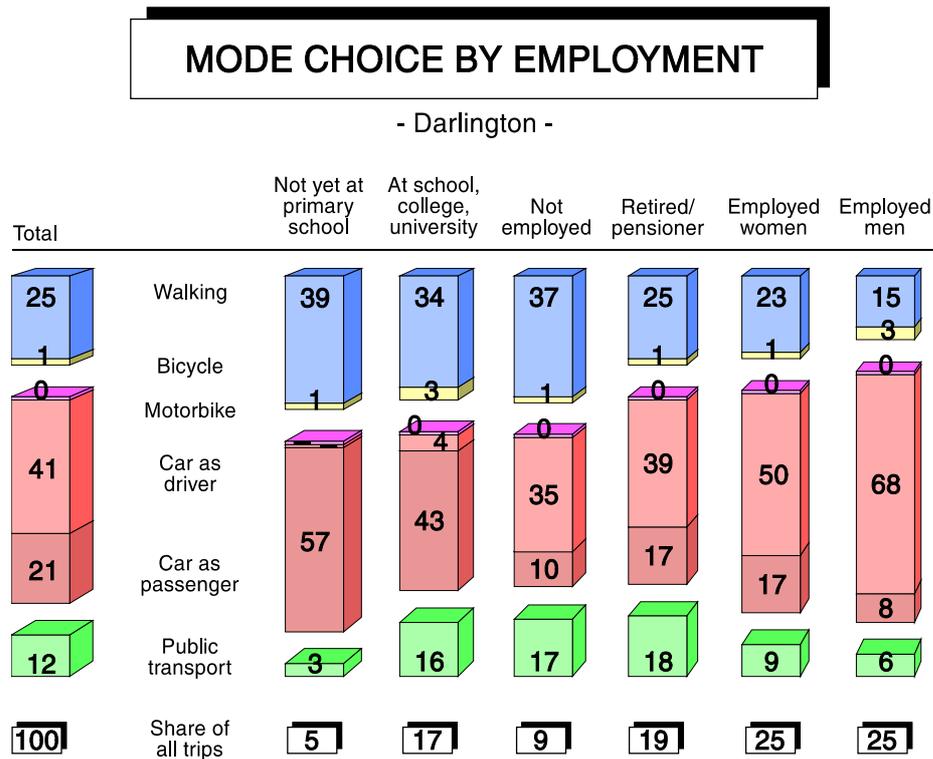
Not employed people (people with home duties and people looking for work) make 37 % of their trips on foot. More than one third (35 %) of their trips is by car as driver, 10 % as passenger and 17 % with public transport.

Retired people have almost the same share of public transport trips (18 %) as unemployed people but they make fewer walking trips (25 %) and more trips with car as driver (39 %) or passenger (17 %).

Employed women use the car more often than most other groups presented: 50 % of their trips are by car as driver and 17 % as passenger. This is exceeded only by employed men: more than two thirds (68 %) of their trips are with car as driver and only 15 % by walking and 6 % by public transport.

Figure 3.10 summarises these pattern using traffic lights, showing red for car as driver, yellow for car as passenger and green for sustainable travel modes (STM).

In total, slightly more trips are done by car as driver (41 %) than by all sustainable travel modes combined (38 %).

Figure 3.10: Modal choice – Darlington traffic light

MODAL CHOICE - DARLINGTON TRAFFIC LIGHT
- all trips, all days, all persons -

TOTAL	Not yet at primary school	School/ College/ University	Not employed	Retired/ pensioner	Employed women	Employed men
41		4	35	39	50	68
38	43	53	55	44	33	24

● Car driver
○ Car passenger
● Sustainable travel modes (Walking, bicycle, public transport)
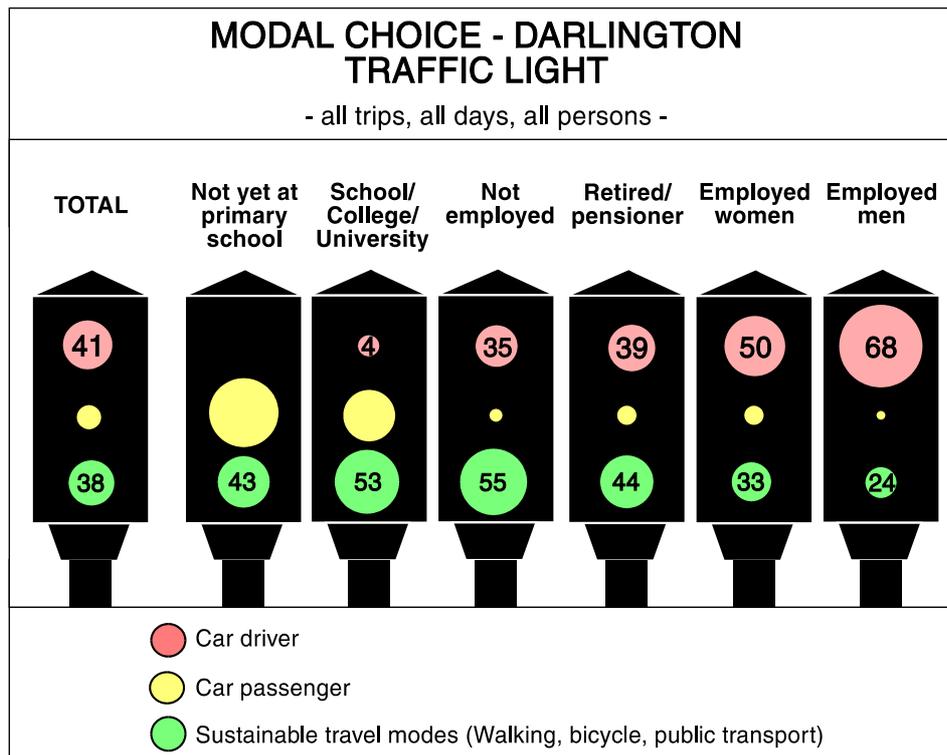
These traffic lights show that younger people (in education) and not employed people (people with home duties and people looking for work) do more than half of their trips with STM. Retired people do fewer trips with STM but still the STM share is larger than the share of trips with car as driver.

For employed people the 'red' becomes the largest of the traffic lights. Every second trip by employed women is by car as driver and only one third by STM. Employed men use car as driver for 68 % of their trips, about a quarter (24 %) of their trips is by walking, bicycle or public transport.

3.4   Duration and Distance

Figure 3.11 shows the amount of time spent each travelling by different modes. On an average day people living in Darlington spend 57 minutes travelling.

Figure 3.11: Exposure

EXPOSURE

- Darlington -

Per person/day (in minutes); trip-legs

Public transport

Walking

7'

9'

57'

21'

19'

1'

0'

Bicycle

Car as passenger

Motorbike

Car as driver
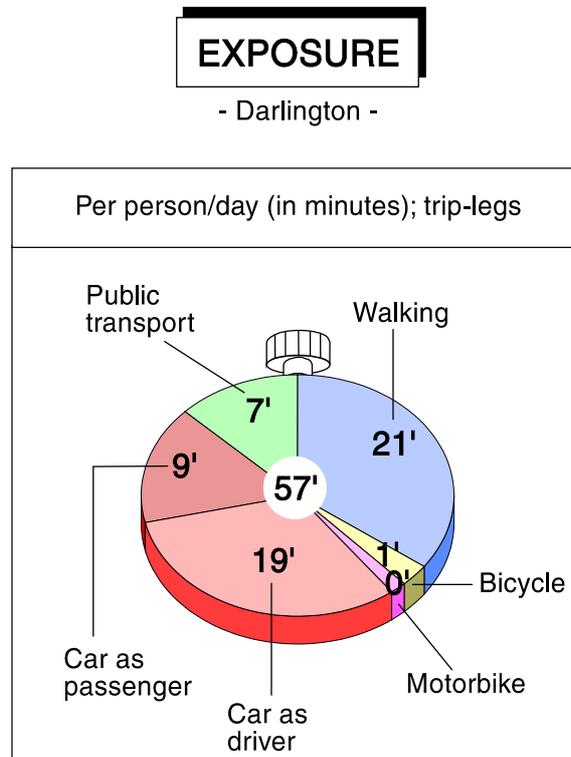
The 57 minutes travelling per day can be split on the modes used: On average people walk 21 minutes per day (including walking legs within public transport use to/from station or within car trips to/from parking place), they cycle for one minute, use cars 19 minutes as driver and 9 minutes as passenger and spend 7 minutes travelling by public transport.

Figure 3.12 compares trips by distance for all trips and car trips. Around one fifth of all trips (21 %) by Darlington residents are no further than one kilometre and nearly half (47 %) of all trips are no longer than three kilometres.

Almost three quarters of trips (74 %) are in the range of five kilometres and another 10 % are between 5.1 and 10.0 kilometres. Only one sixth of all trips are longer than ten kilometres.

Figure 3.12: Trips by distance

TRIPS BY DISTANCE

- Darlington -

All trips	- Cumulated -	Car trips
21	Up to 1.0 km	7
47	Up to 3.0 km	29
74	Up to 5.0 km	61
84	Up to 10.0 km	74
100	Total	100
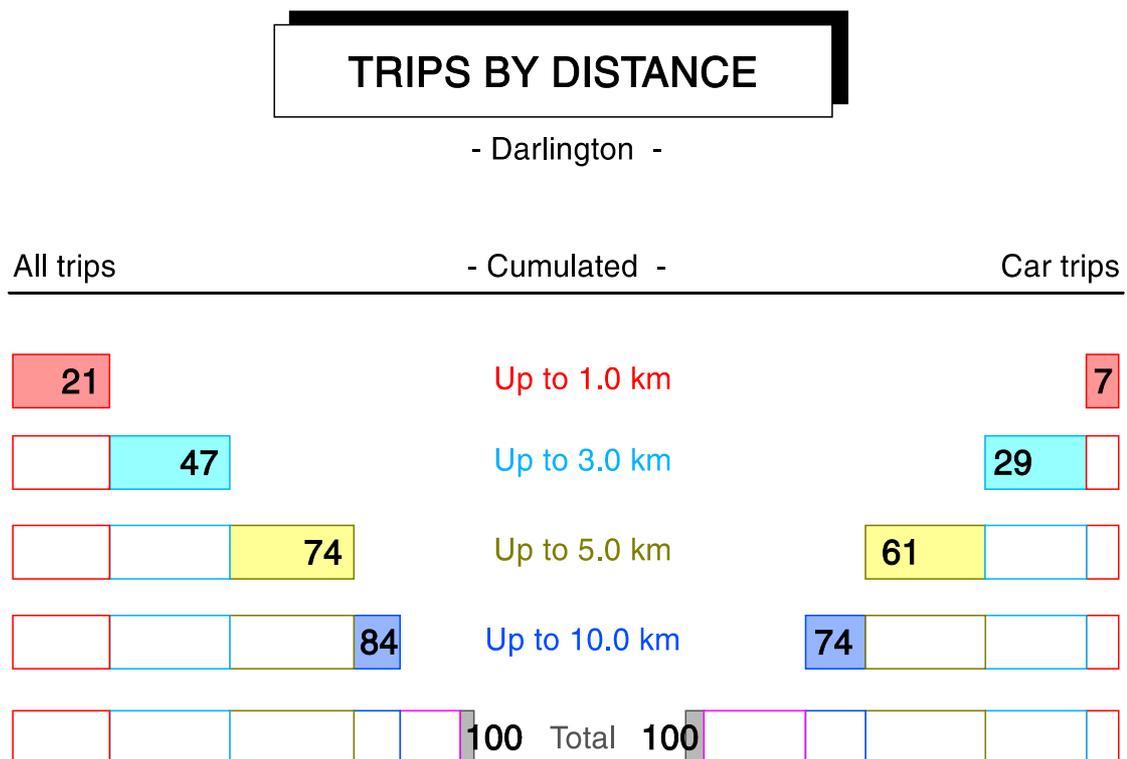
The car is used for many short trips: 7 % of all car trips are no further than one kilometre, 22 % between one and three kilometres and another third between 3.1 and 5.0 kilometres. Six out of ten (61 %) of all car trips are no longer than five kilometres.

Only one quarter (26 %) of all car trips covers a distance of more than 10 kilometres.

3.5   Car usage

Figure 3.13 shows the extent to which privately owned cars in Darlington are used on a daily basis:

- A little over three quarters of privately owned cars in Darlington (77 %) are used at least once a day.

- Each car is used for an average of 2.5 trips with a total duration of 42 minutes per day.

- The average distance covered per (private) car for everyday car trips (excluding commercial and long-distance trips) is 25 kilometres per day, and

- each car is occupied by an average of 1.5 people (including the driver).

Figure 3.13: Car usage
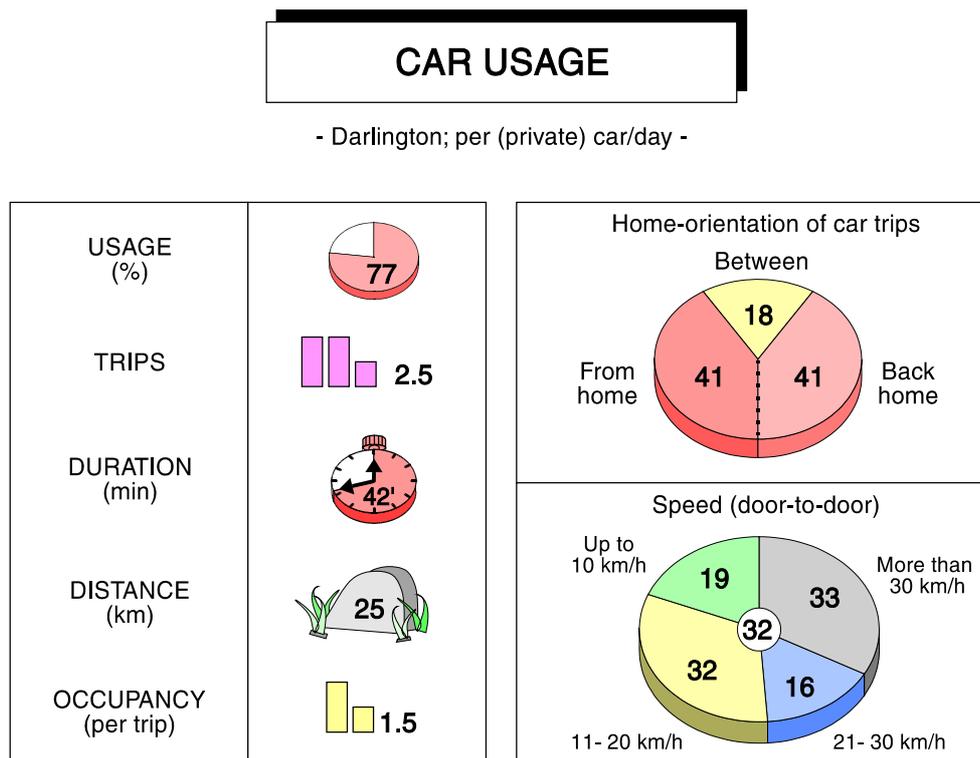
Five out of six (82 %) car trips start at home or lead back to home from an activity. Only 18 % of all car trips occur between two out-of-home destinations.

The average speed (door-to-door, including walking legs to or from parking space and searching time for a parking space) of car trips is 32 km/h. About one fifth (19 %)

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reaches just an average speed per trip of up to 10 km/h. Only every third car trip is faster than 30 km/h (including walking legs).

3.6   Spatial orientation

The spatial orientation of trips by Darlington residents is shown in Figure 3.14.   The majority of trips is local. In more than three quarters (77 %) of all their trips Darlington residents remain within the Darlington urban area, (i.e. the trips begin and end in the town). The average distance of these trips is about 3 kilometres.

One fifth of all trips (20 %) leads to a destination outside the Darlington urban area or back to the town ('to/from') with an average distance of 23 kilometres. 3 % of all trips are completely outside Darlington ('outside').

Figure   3.14: Spatial orientation
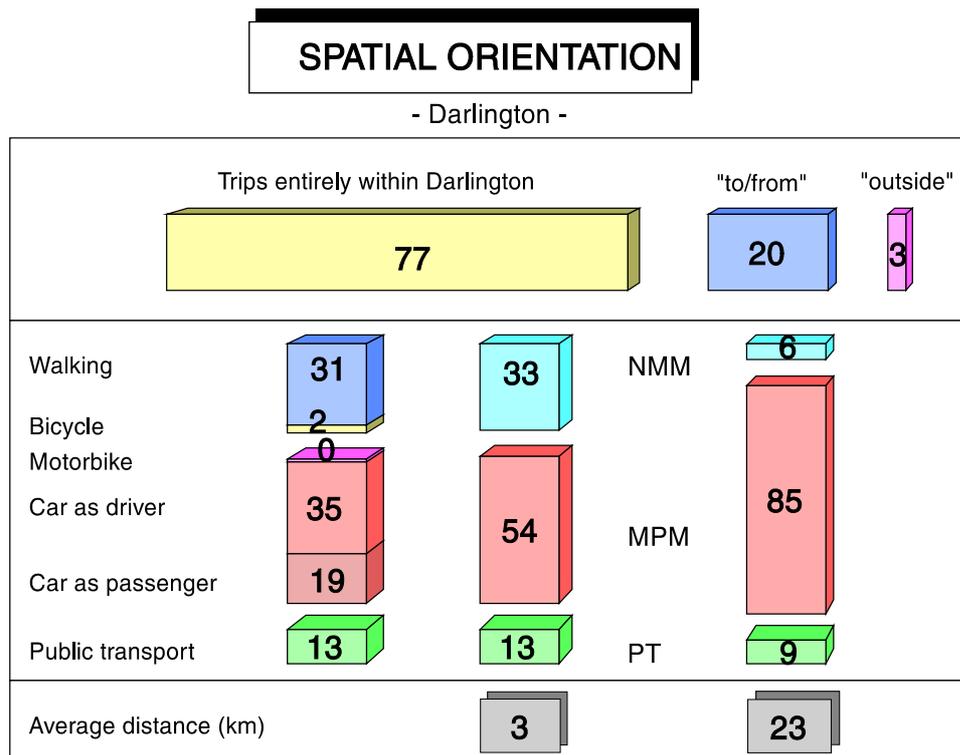
Of all trips within the Darlington urban area almost one third (31 %) are only by walking. Cycling accounts for around 2 % of trips within the town.

The share of trips within the town by motorbike is less than 0.5 %. More than one third (35 %) of trips within Darlington are car trips as driver, almost one fifth (19 %)

are car trips as passenger. In total there are 54 % trips with motorised private modes (MPM).

At least 13 % of trips within Darlington show the use of a public transport mode.

Six out of seven (85 %) trips leading outside of Darlington or back are by motorised private modes, 9 % by public transport.

Figure 3.15 compares mode choice on all trips with trips to and from the town centre, and with town centre shopping trips. The town centre is destination or starting point for 14 % of all trips of Darlington people: Darlington residents use walking for 22 %, bicycle for 1 %, car as driver for 30 % and as passenger for 15 % of their town centre trips. The share of public transport for trips to or from the town centre is much larger than for all trips (32 % compared to 12 %).

Figure 3.15: Mode choice
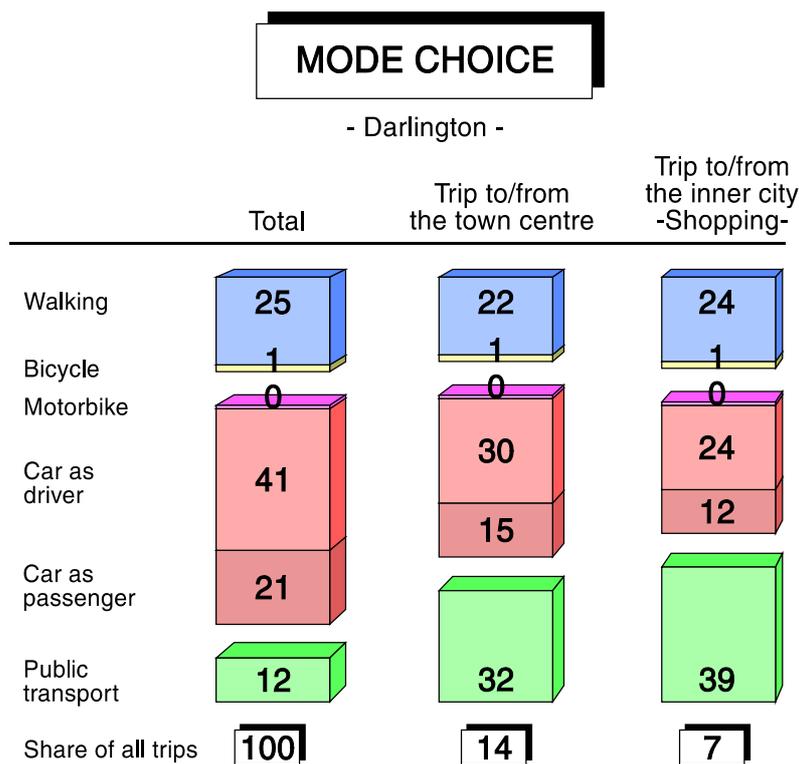
The public transport share is even larger for shopping trips to or from the town centre (39 %). For these shopping trips a car is used as driver for only a quarter of trips (24 %) and as passenger for only 12 %.

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The basic travel characteristics can also be analysed by the ward people live in. Most interesting is the mode choice, showing quite a wide range due to varying socio-demographics, geography, supply of modes, etc.

Figure 3.16: Mode choice per ward

MODE CHOICE PER WARD

- Darlington -

Mode	Total	Bank Top	Central	Cockerton East	Cockerton West	College	Eastbourne	Faverdale	Harrowgate Hill	Haughton East	Haughton North	Haughton West	Hummersknott	Lascelles	Lingfield	Mowden	North Road	Northgate	Park East	Park West	Pierremont
Walking	25	24	32	23	30	32	22	14	20	19	17	17	20	35	24	27	26	40	25	23	33
Bicycle	1	5	1	1	1	1	0	1	2	1	1		5	1	2	0		2	1	2
Motorbike	0	0	1	1	0		0	0	0	0		0	0	0	0		0	0	0	0
Car as driver	41	32	38	45	29	45	40	57	39	37	49	44	51	32	41	45	41	32	37	51	41
Car as passenger	21	16	12	24	14	19	22	24	25	29	22	26	23	13	19	20	20	17	23	20	17
Public transport	12	23	16	7	25	3	15	4	15	14	10	12	5	15	15	6	13	11	13	5	7

Walking shares range from 14 to 40 % even though most are around the average of Darlington (25 %). The share of bicycle trips ranges from between less than 0.5 % to 5 %.

The differences for car use are less than for walking or public transport. The share of car as driver ranges between 29 and 57 %, the share of car as passenger is between 12 and 29 %.

For public transport the share in most wards is between 3 and 15 %. There are two wards with a much larger share of public transport trips: Bank Top with 23 % and Cockerton West with 25 %.

4   *Perception and Attitudes*

4.1   *Introduction*

This section presents the key findings of the part of the in-depth research relating to attitudes and perceptions. They are based on the interview responses of a random sub-sample of respondents[5] to the main travel behaviour survey.

4.2   *Living in Darlington*

At the beginning of the interview people were asked if they liked living in Darlington. The vast majority (94 %) responded positively. Only 6 % of Darlington residents would prefer to live somewhere else.

Figure   4.1:   Do you like living here?

DO YOU LIKE LIVING HERE?

- Darlington -

Prefer
somewhere
else

6

94

Like living here

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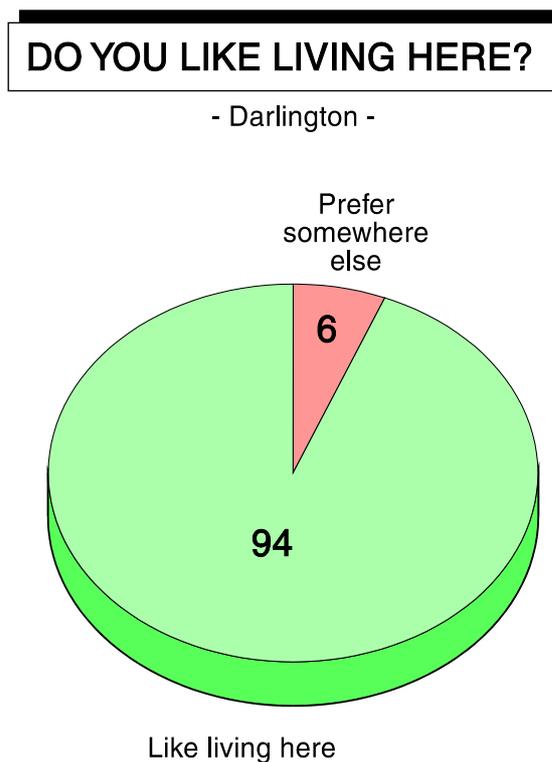
[5] ... people (net) aged over 14 years.

4.3   Perception of traffic situation

Public perceptions of the local road traffic situation are summarised in Figure 4.2. This shows that nearly all Darlington residents (97 %) think that car traffic has increased within the past few years, with only 3 % perceiving no increase. A very small share of residents (3 %) judged this development as positive, the remaining 94 % judged it as negative.

Figure   4.2:   Evolution of car traffic
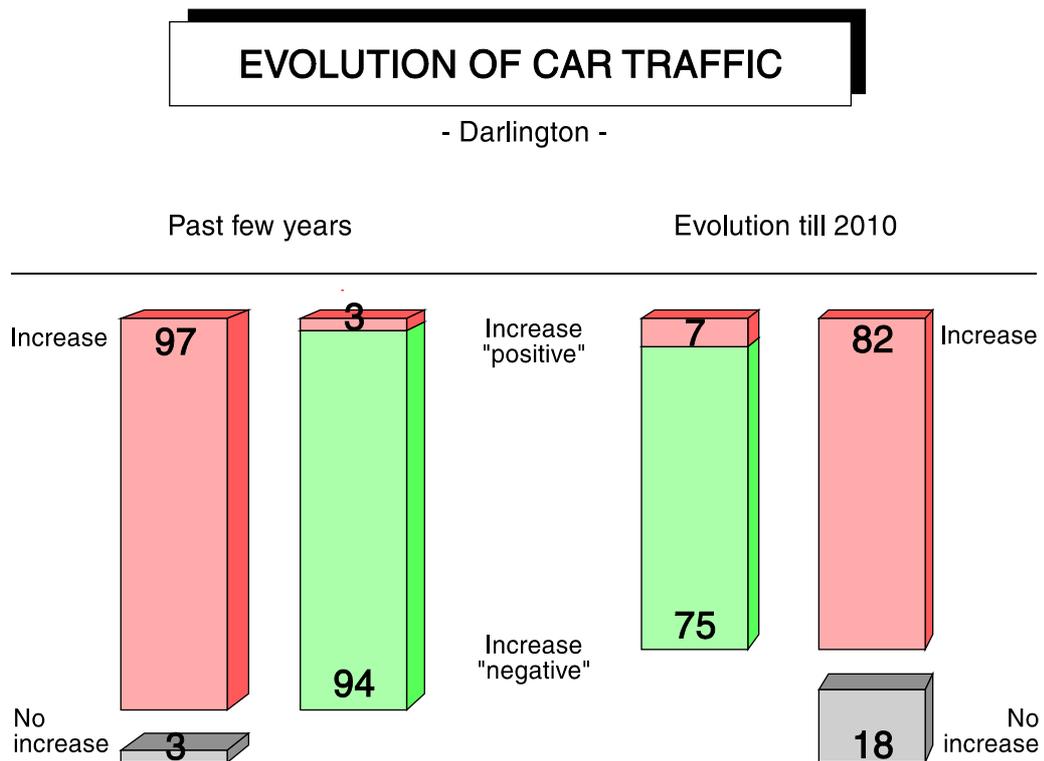
Interviewees were also asked to assess the likely evolution of traffic up to 2010. More than four in five (82 %) expect traffic to increase and the overwhelming majority of these people view this as a negative development.

Figure 4.3 shows the findings of a similar assessment carried out for public transport, cycling and walking:

- Nearly three-quarters of respondents thought there would be no increase in public transport use in the next five years. Of the remainder who thought it would increase, almost all thought this a positive development.

Figure 4.3: Evolution till 2010

EVOLUTION TILL 2010

- Darlington -

Car		Public Transport	Bicycle	Walking
7	Increase "positive"	27	45	29
		1		2
75	Increase "negative"		3	
18	No increase	72	52	69
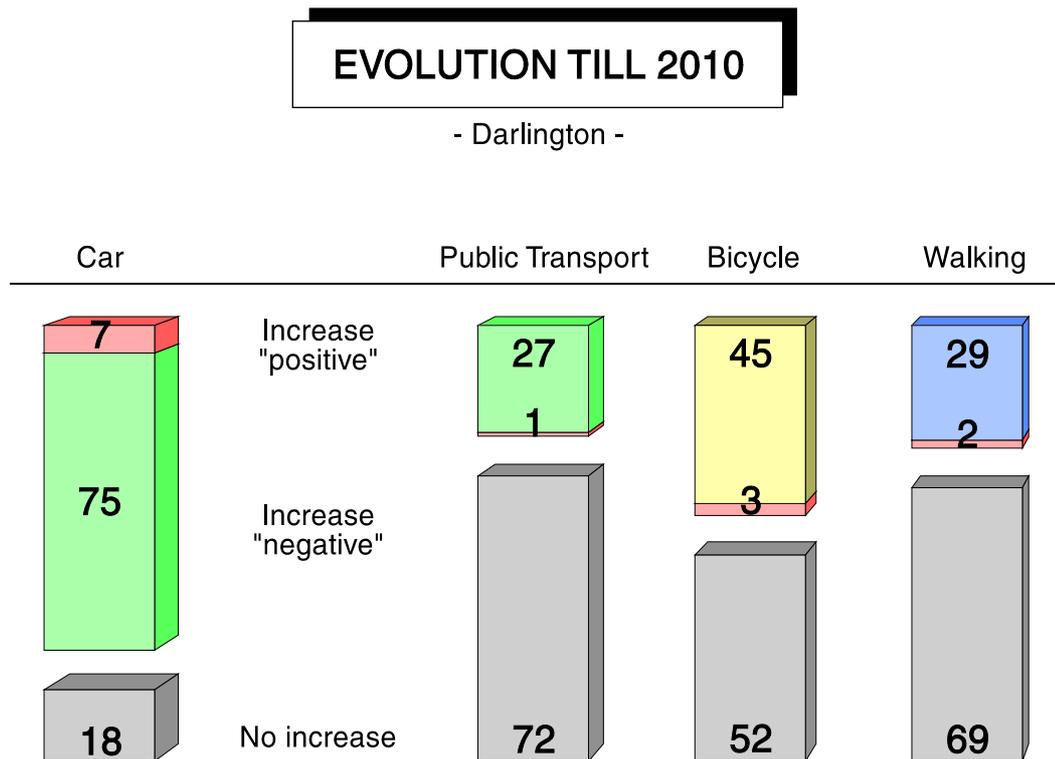
- Roughly half of people (52 %) anticipated no increase by 2010 in the share of trips by bicycle. Most of those that did expect an increase viewed this positively.

- While less than one-third of respondents thought walking levels were likely to increase in the next five years, nearly all of these people would view such an increase positively.

Interviewees in Darlington were also asked about their perceptions of risk for different travel modes. Figure 4.4 shows a roughly even balance between those perceiving a low risk and a high risk to pedestrians (47 and 53 % respectively).

Figure 4.4: Risk of a traffic accident

RISK OF A TRAFFIC ACCIDENT

- Darlington -

Pedestrians		Cyclists
53	(Rather) high	82
47	(Rather) low	18
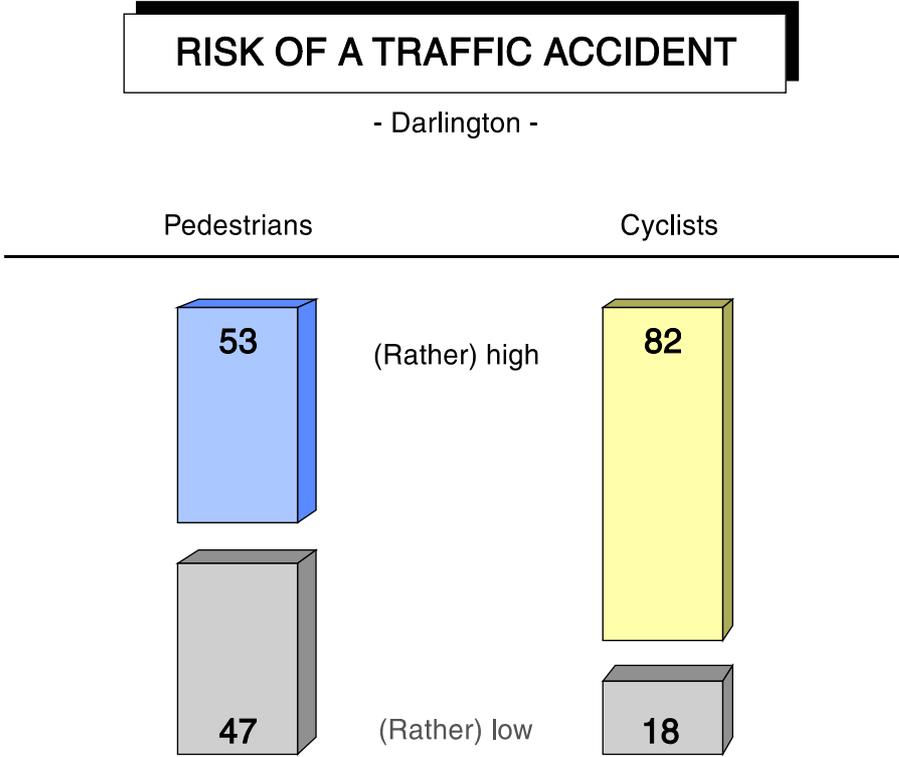
Cycling is perceived as more dangerous: 82 % of Darlington people think the risk of a traffic accident by bicycle is rather high, only one out of six (18 %) believe the risk is rather low.

Figure 4.5: Traffic problems

TRAFFIC PROBLEMS

- Darlington -

| Consequences of car traffic | Solving traffic problems by new technologies |

Well bearable	**49**	Agree	**38**
Not so bearable	**29**	Don`t know	**6**
No longer bearable	**22**	Disagree	**56**
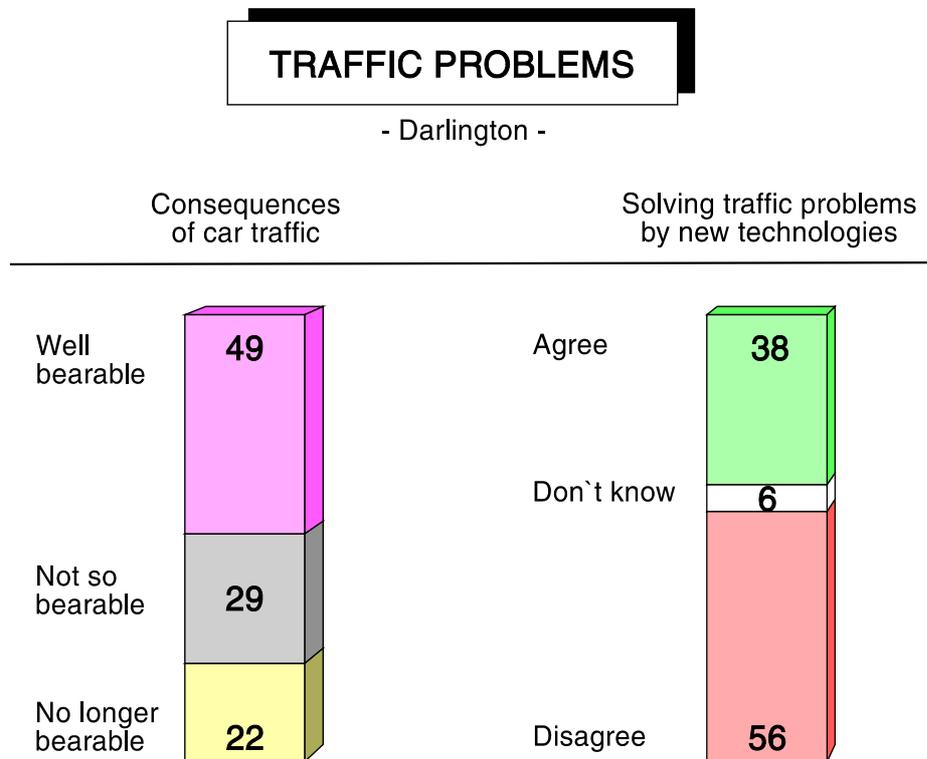
In Darlington almost half of the residents (49 %) assess the consequences of car traffic as well bearable, 29 % as not so bearable and almost a quarter (22 %) as no longer bearable.

Only about one third (38 %) of Darlington people believe that new technologies can solve the current traffic problems, but more than half (56 %) do not agree with this.

Public attitudes towards a range of strategies for tackling traffic problems are summarised in Table 4.6. In general this shows that people in Darlington think it more effective to develop facilities for walking, cycling and public transport than to restrict car use.

Only one third (32 %) of Darlington people think that putting tighter restrictions on where you can park can be effective to solve traffic problems. 67 % believe that this suggestion would be ineffective. This results in a negative index of -35 (32 minus 67).

Limiting car traffic is considered by almost half (48 %) of Darlington people as effective, 50 % think it would be ineffective (index: -2).

Figure 4.6: Suggestions to solve traffic problems

SUGGESTIONS TO SOLVE TRAFFIC PROBLEMS
- Darlington -

	Effective	Don`t know	Ineffective	Index
Putting tighter restrictions on where you can park	32		67	-35
Limiting car traffic	48		50	-2
Creating more pedestrian areas	64		35	+29
Further developing bicycle routes and facilities	73		25	+48
Further developing Public Transport	76		21	+55
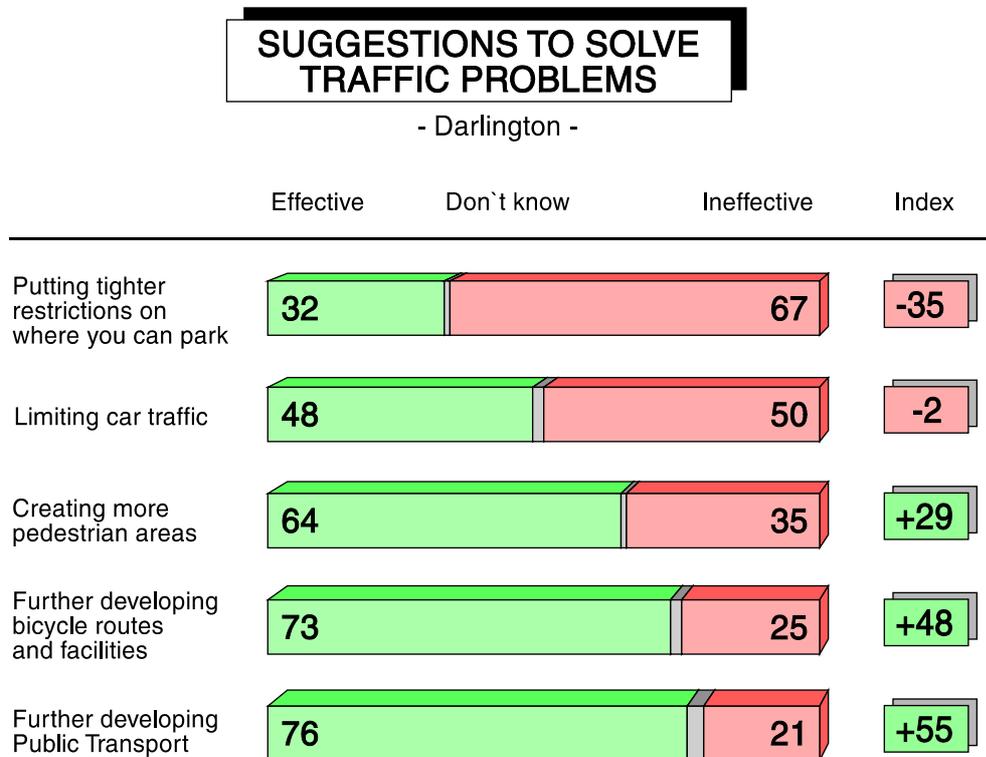
Almost two thirds (64 %) believe that creating more pedestrian areas would be effective (index: +29).

Developing bicycle routes and facilities is supported even by three out of four people (73 %) with an index of +48. And a further development of public transport is judged as effective by 76 %, only one fifth thinks that this would be ineffective (index: +55).

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4.4 Attitudes towards modes

The interviews also explored people's attitudes towards potential traffic planning conflicts between the car and sustainable travel modes.

In Darlington, 79 % of respondents would support measures favouring public transport, even if these disadvantaged car users (see Figure 4.7).

Figure 4.7: Traffic planning conflicts
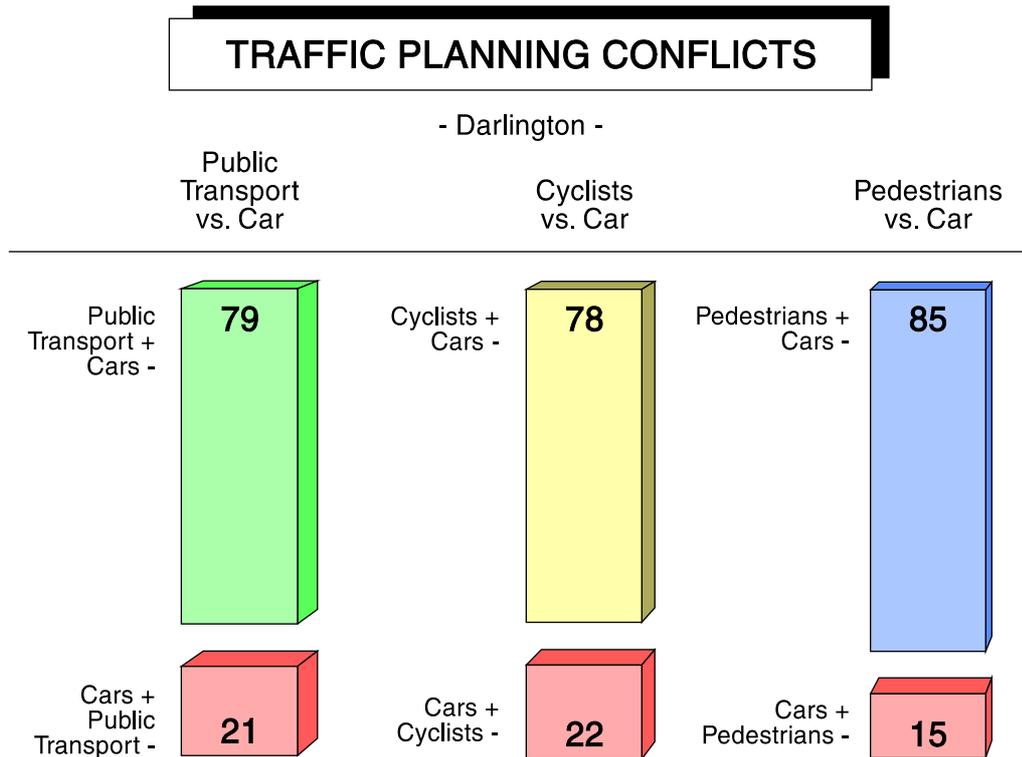
More than three-quarters of Darlington respondents (78 %) would favour measures for cycling instead of the car.

In the case of a traffic planning conflict between the car and walking as a mode of transport , more than four fifths (85 %) favour improvements for pedestrians.

A similar survey was conducted during the 1990s across all Member States of the European Union. Therefore it is possible to compare some indicators in Darlington with the results in the United Kingdom and in the European Union (UK included).

Overall 85 % of respondents in Darlington favoured making sustainable travel modes (walking, cycling, public transport) a priority in transport policy and / or planning. roughly the same proportion as across the UK and EU (see Figure 4.8).

Figure 4.8: Expectations from transport policy / planning
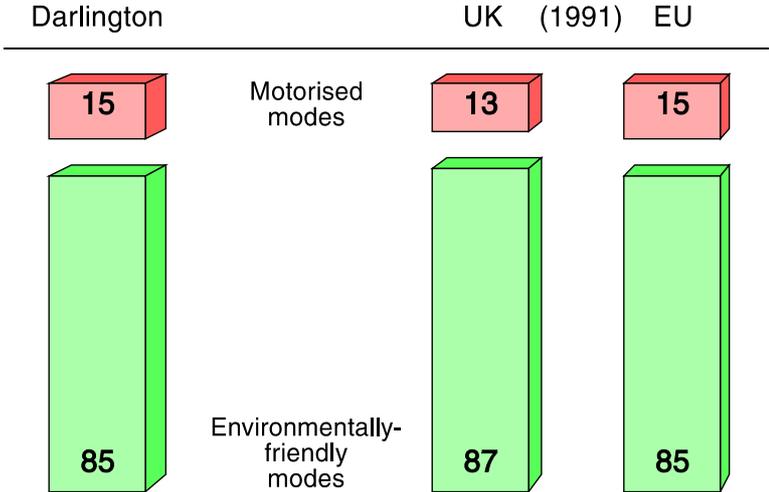
4.5   Perception of public transport

The research included a detailed assessment of public perceptions and attitudes towards public transport.

This suggested that 39 % of people in Darlington are satisfied with public transport and 26 % are dissatisfied (see Figure 4.9). This results in a satisfaction-index of +13 (39 minus 26).

Figure 4.9:   Public transport
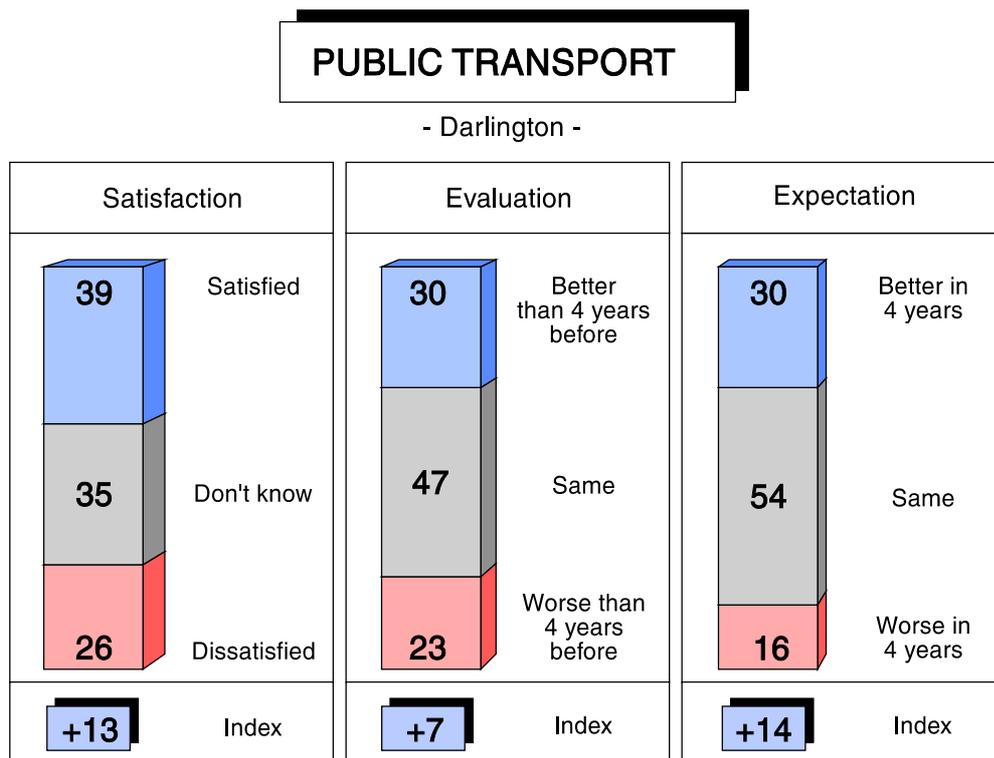
Almost one third (30 %) evaluated the public transport system as better than four years ago, less than half assess it as being the same (47 %) and almost a quarter perceived it as worse than four years ago (23 %). This results in an evaluation-index of +7.

Nearly one third of respondents expected public transport to be better in four years' time, about the half (54 %) expected it to be the same. Only about one in six residents presumes public transport will be worse in four years' time. This results in an expectation-index of +14.

When people were asked to consider future measures in favour of public transport, 74 % agreed that more public transport improvements should be carried out and only 2 % disagreed. This results in an approval-index of +72 (see Figure 4.10).

Figure 4.10: Future measures in favour of public transport

FUTURE MEASURES IN FAVOUR OF PUBLIC TRANSPORT

- Darlington -

	Agree	Neutral	Disagree	Index
More improvements	74		2	+72
More (financial) support	53		10	+43
Public transport budget reduced in favour of road construction	32		30	+2
Politicians more committed to public transport	64		6	+58
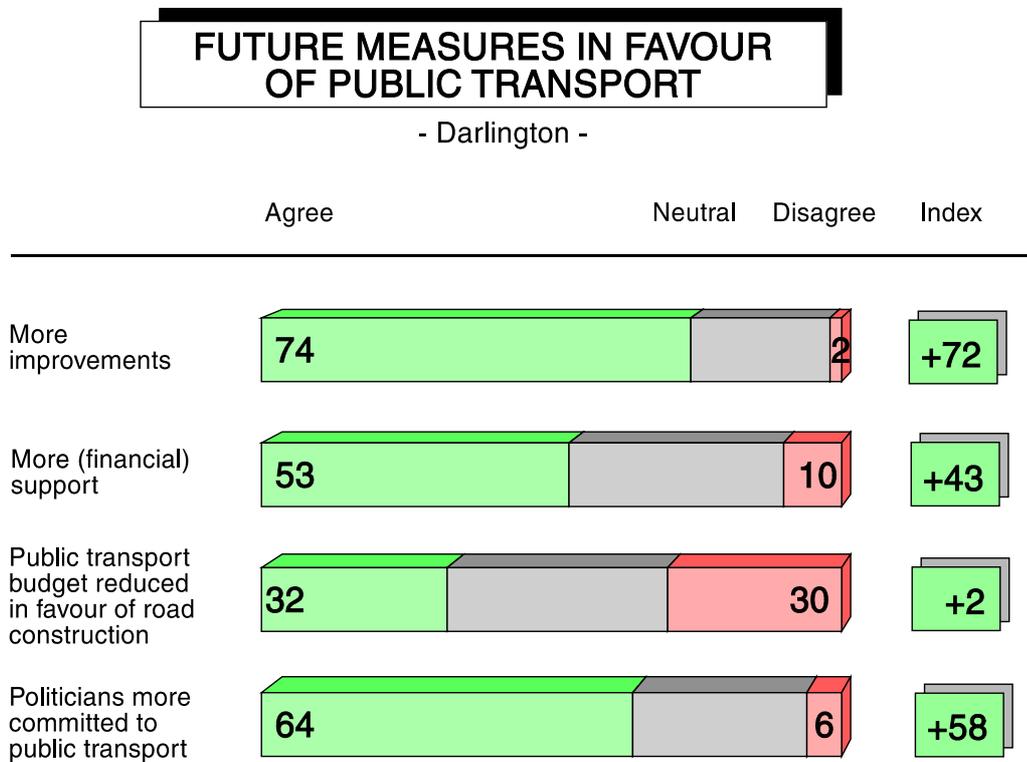
More than half of respondents (53 %) favoured more financial support for public transport.

In response to the reciprocal question on whether the public transport budget should be reduced in favour of road construction, slightly more agreed than disagreed (32 % compared with 30 %). Nearly two-thirds (64 %) agreed with the statement that politicians should be more committed to public transport, 6 % disagreed. Therefore this makes up for an approval-index of +58.

5 Potential for Behaviour Change

5.1 Introduction

Reducing car use through promotion of sustainable travel modes is the key aim of Darlington's 'Town on the Move' programme. This chapter reports on the detailed potential for change away from use of the car.

5.2 Potential for the Reduction of Car Usage

The travel behaviour survey of Darlington residents showed that, on average, a private car is used for 835 trips per year. Of these 835 trips, 549 (66 %) are entirely within Darlington (see Figure 5.1)[6].

Figure 5.1: Private car trips per year

PRIVATE CAR TRIPS PER YEAR

- Darlington -

All car trips per year	835
Car trips within Darlington	549

	Up to 1.0 km (Ø 0.7 km)	1.1 to 3.0 km (Ø 1.9 km)	3.1 to 5.0 km (Ø 3.8 km)	Over 5.0 km	Total	
Work	10	39	63	24	136	25%
Shopping/ Pers. business	21	58	66	19	164	30%
Leisure	15	43	63	22	143	26%
Other	13	39	43	11	106	19%
Total	59	179	235	76	549	
	11%	32%	43%	14%		
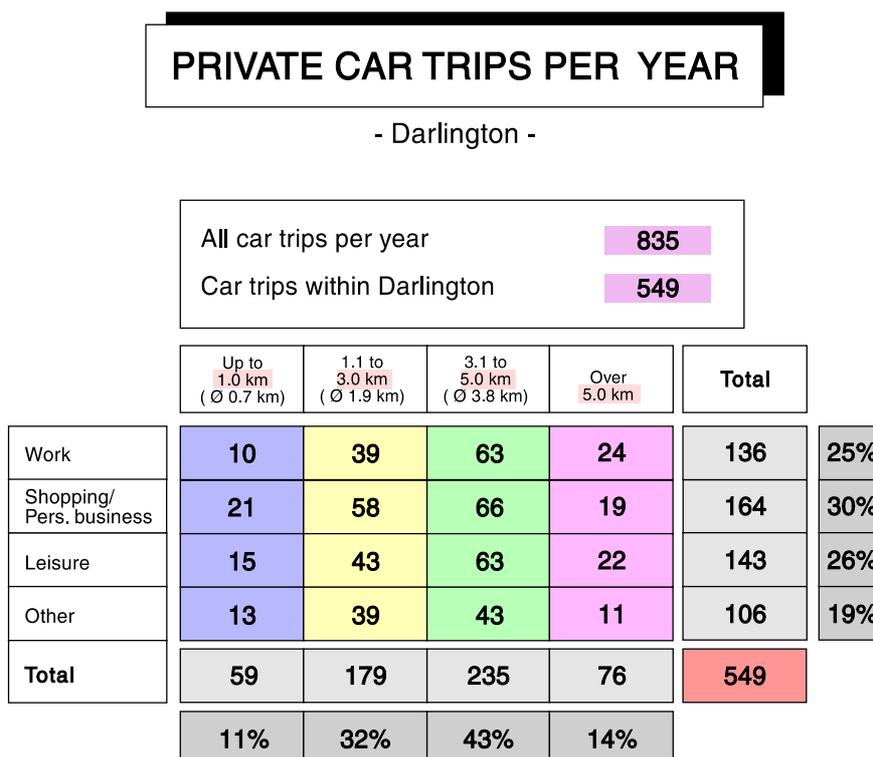
Even a superficial glance at the individual fields of the matrix in Figure 5.1 shows that there are clearly many car trips for which it is difficult to imagine that it is absolutely necessary to use motorised private modes.

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[6] A (private) car can be used by more than one member of the household, and for more than one trip

11 % of all trips by car within Darlington are 1 km or less, more than a third (32 %) of the car trips are between 1 and 3 km. Trips of these distances are potential walking trips, provided that there are no constraints such as disability, the need to carry heavy parcels or trip chaining to other activities further away. Almost half the car trips (43 %) are less than 3 km, only 14 % are further than 5 kilometres.

However, to determine the genuine potential for replacing car trips it is necessary to test each individual trip to see if there was an objective reason for using the car (e.g. business use of the car, car trip within a longer transport chain, transport problems etc.) and whether an alternative mode would in fact have been available[7].

Figure 5.2:   Car trips (year)

CAR TRIPS (YEAR)

- Darlington; trips within Darlington -

Total	Possibilities for reduction	
549	**307** **(56%)**	Car use solely for subjective reasons; alternative available
	242 **(44%)**	Constraints and / or no alternative available
(100%)		
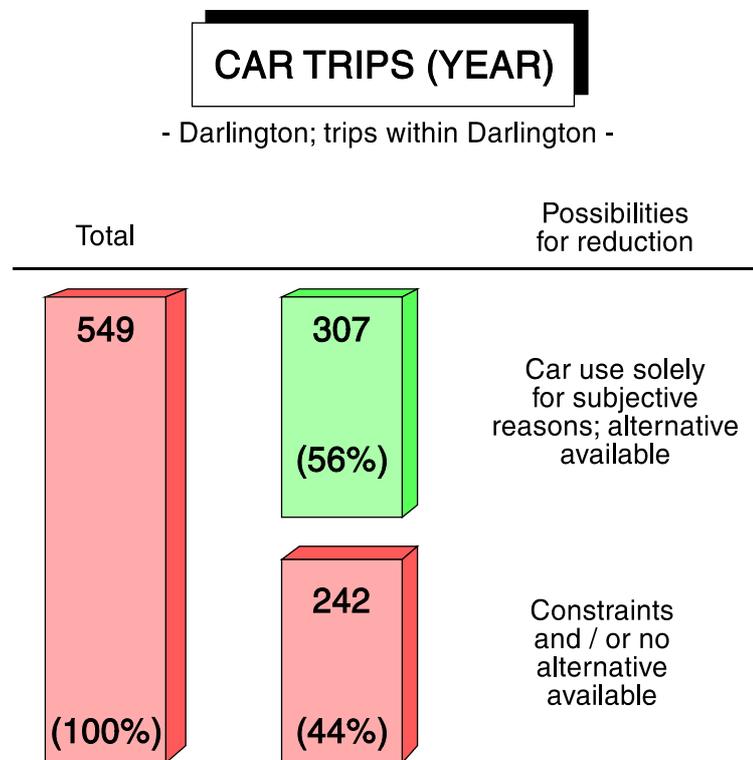
Figure 5.2 shows that of 549 (private) car trips within Darlington, 44 % have no mode alternative (e.g. lack of public transport alternative, no bicycle available, walking impossible) and / or there are constraints against using the alternatives (e.g. heavy parcels, using a car because of business reasons, trip chain etc.).

However, more than half (56 %) of all car trips within Darlington are without con-straints and have at least one environmentally-friendly mode alternative (public trans-port, bicycle, walking) available – so the car is used solely for subjective reasons.

---

[7] The ‚Situational Approach' used as basic concept for this analysis is described in Annex 2.

Figure 5.3: *Car trips (year) including alternatives*

CAR TRIPS (YEAR)

- Darlington; trips within Darlington -

Total	Car use solely for subjective reasons	In principle replaceable by:

Public transport   Bicycle   Walking

(average 1.4 alternatives)

549 (100%)

307 (56%)

143 (26%)

187 (34%)

115 (21%)
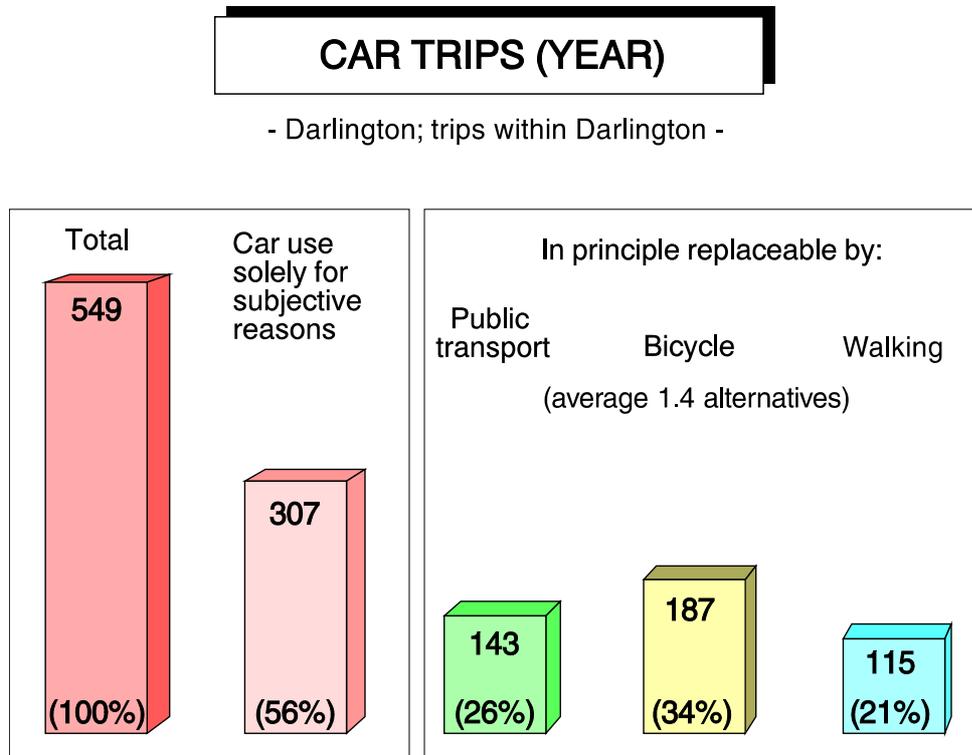
Figure 5.3 examine these trips in more detail. Of all car trips within Darlington about half (56 %) could be made by at least one alternative. On average there are 1.4 alternatives for each car trip.

A quarter of all car trips within Darlington (26 %) are replaceable by public transport, one third (34 %) by bicycle and 21 % by walking.

More than one third (38 %) of all trips is made by sustainable travel modes (walking, bicycle, public transport). The other 62 % are made by motorised private modes (motorbike, car as driver or car as passenger). But there are potentials to change modes:

Figure 5.4: Potentials for "sustainable travel modes"

POTENTIALS FOR
"SUSTAINABLE TRAVEL MODES"

- Darlington -

Constraints

No adequate alternative

22

8

38

Actual usage (walking, bicycle, public transport)

32

Only subjective reasons against STM
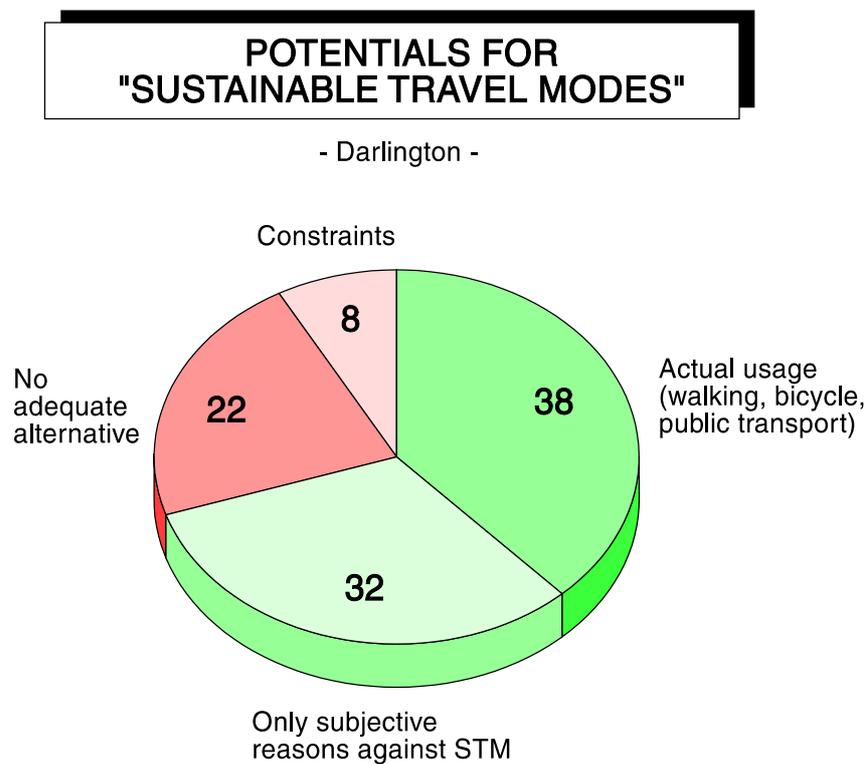
For 8 % of all trips there is no potential for the sustainable modes due to constraints (e.g. luggage, health reasons, age, passenger transport).

In another 22 % of all trips there is no adequate alternative of a sustainable travel mode available. This could be due to reasons like no adequate public transport connection, no bicycle available or distance too far (for cycling or walking).

Finally there is almost one third (32 %) of all trips with only subjective reasons against walking, bicycle and public transport (reasons of lack of information / acceptance, time, costs, comfort, infrastructure).

5.3   Potential for public transport

To determine the potential for public transport a detailed analysis is necessary of the reasons individual trips are not made by public transport (see Figure 5.5). The analysis is based on an average week-day.

Figure 5.5:   Situations of mode choice
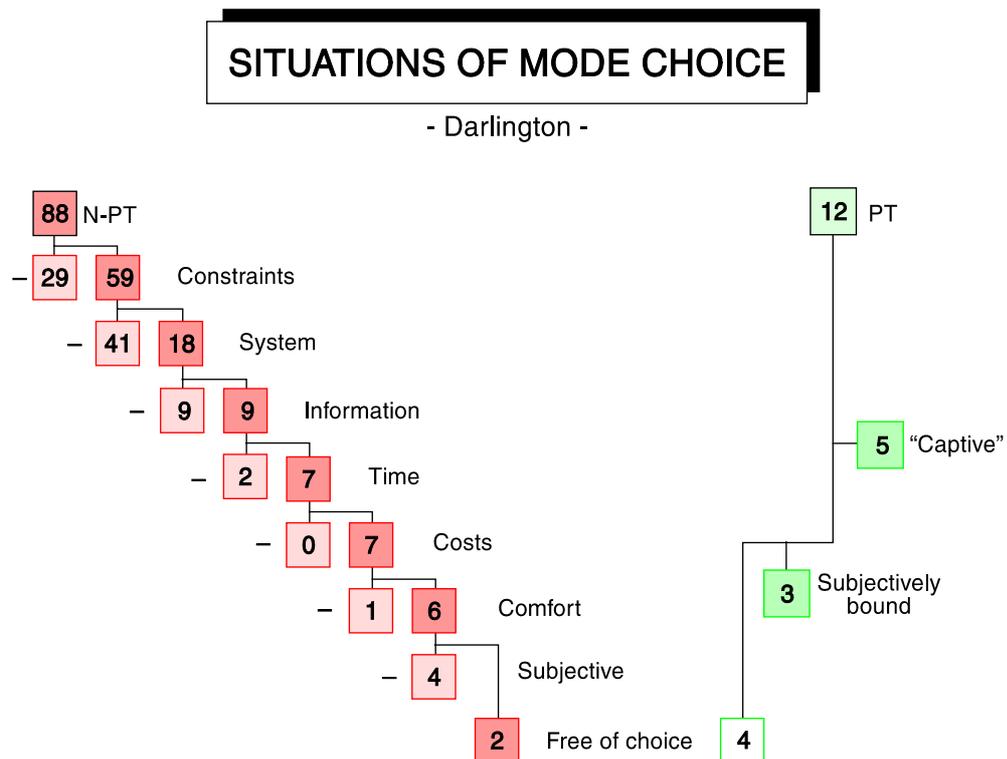
Twelve percent of all trips by Darlington residents are made by public transport (PT), and so 88 % are made by other modes (N-PT).

Constraints (e.g. carrying large parcels or using the car for business reasons) are the reason for almost a third of all trips (29 %) not being potential public transport trips. For 41 % of all trips there is no adequate public transport available or the service time makes it unavailable ('system').

All these reasons are objective reasons which cannot effectively be solved or will require system improvements.

This means that for the remaining 18 % of all trips there are *subjective* reasons preventing the use of public transport. This potential for the use of public transport is 50 % higher than the current use (12 %). For half of these trips, lack of information was the main reason public transport was not used, meaning that that an additional 9 % of all trips could be undertaken by public transport if people were better informed. This would bring the overall mode share of public transport to 21 %. This analysis belies the economic theory that assumes a perfect market place with all buyers fully informed.

In only 2 % of cases perceptions of time are the reason for not using public transport. Costs are often considered too high by the general public, but it was rarely mentioned in this analysis as a reason for not using public transport (less than 0.5 % of all trips). Perception of lack of comfort is also hardly mentioned as a reason for not taking public transport (1 %). For 4 % of all trips, various other subjective reasons (prejudices, attitudes, etc.) hinder the use of public transport.

This leaves a share of 2 % of all trips for which there is a 'free of choice' decision not to use public transport – that is, people are informed and have no negative perceptions about public transport, but still choose to use the car.

One third of all trips with public transport are currently free of choice (4 out of 12 %), 3 % are subjectively bound and 5 % are "objectively" bound ("captives"). This means that a remarkable share of the current public transport demand could also use another mode of transport.

The potential for increasing use of public transport is summarised further in Figure 5.6:

Figure 5.6:   Potentials for public transport

POTENTIALS FOR PUBLIC TRANSPORT
- Darlington -

| N-PT | 88 | | 12 | PT |

Constraints — 29

No adequate connection — 41

Lack of information / acceptance — 15

Negative subject. evaluation — 1

2   Free of choice   4

3   Subjectively bound

5   "Objectively" bound ("Captives")
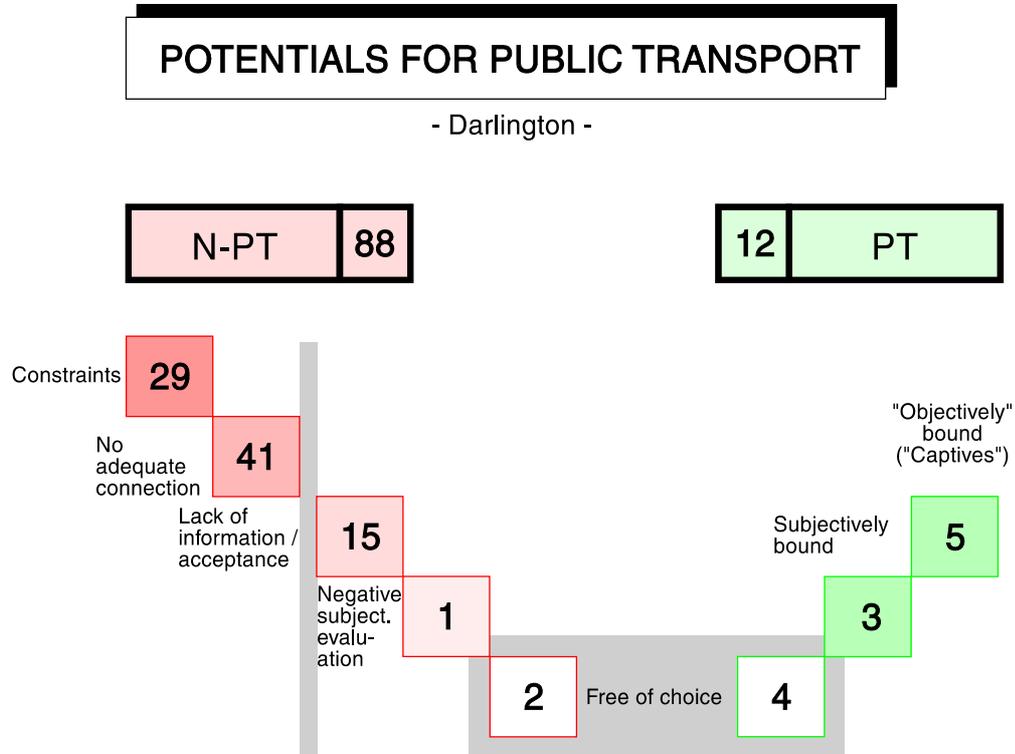
Of all trips, 12 % are currently undertaken by public transport. For 6 % of all trips people have a free choice to travel by public transport or by other modes ie there are no objective constraints or subjective reasons preventing public transport use. There are 2 % of trips where there are no constraints, people are well informed and positive about the public transport system, but still choose not to use it. By motivating these people, there is the potential to increase the number of people using public transport. Conversely there are 4 % of trips where people currently use public transport, but could change to using other modes.

There are a further 16 % of trips currently undertaken by other modes where principally public transport could be used – there are no constraints and a public transport connection is available. There is the potential to change these trips through improved information, improved perception of the system quality and motivating well-informed people to make the change to public transport.

From this analysis it is evident that lack of information is an important factor preventing use of public transport – even in cases where there is an adequate connection:

Figure 5.7: Extent of Information

EXTENT OF INFORMATION

- Darlington; motorised private modes -

Public transport available; no constraints

Informed
(to some
extent)

50   50

(Nearly)
not informed
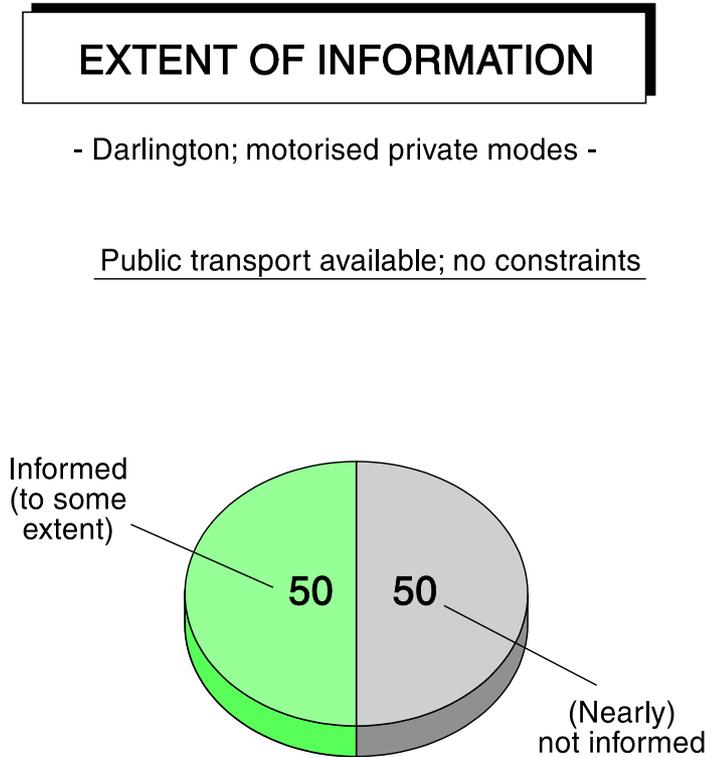
This means there are trips made by motorised private modes even though there are no constraints to using public transport and the service is available. Figure 5.7 shows that a lack of information prevents use of public transport for half of these trips.

Research shows consistently that people perceive public transport to be worse than it actually is. Figure 5.8 shows how respondents in Darlington perceived travel time by public transport compared with motorised private modes.

Figure 5.8: Perception of travel time

PERCEPTION OF TRAVEL TIME

- Darlington; trips with motorised private modes -

Public transport available; informed; no constraints on using public transport
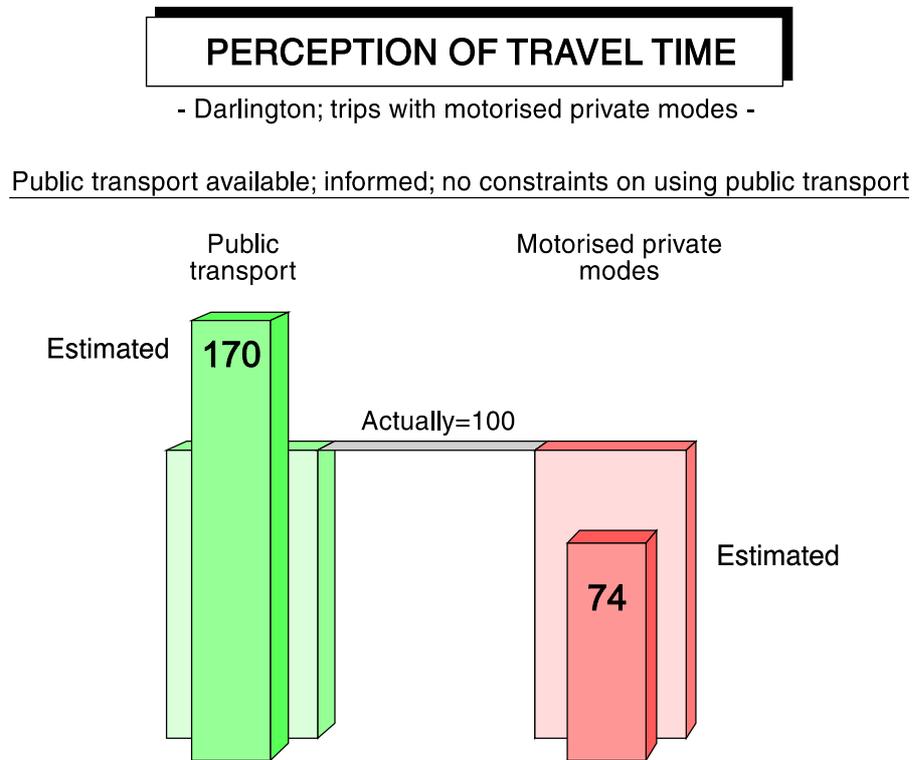
This shows that people overestimate the time taken by public transport by more than two thirds (70 %) and at the same time underestimate the time for trips with motorised private modes by a quarter (26 %). The time taken for this estimation is the duration from door to door – for example, walking to the bus stop, the bus trip, walking to the destination.

To put it another way, the <u>subjective</u> duration of travel time by the public transport alternative is more than two times that of motorised private modes.

5.4   Potential for Cycling

The situational approach also enables us to identify why people do not cycle (see Figure 5.9).

Figure 5.9:   Potential for the bicycle

POTENTIAL FOR THE BICYCLE

- Darlington; Trips within Darlington -

Car trips with no constraints, bicycle available (34%)

Negative judgement

Total	Time	Infrastructure	Comfort	Community climate	Free of choice
100	44	4	5	8	39
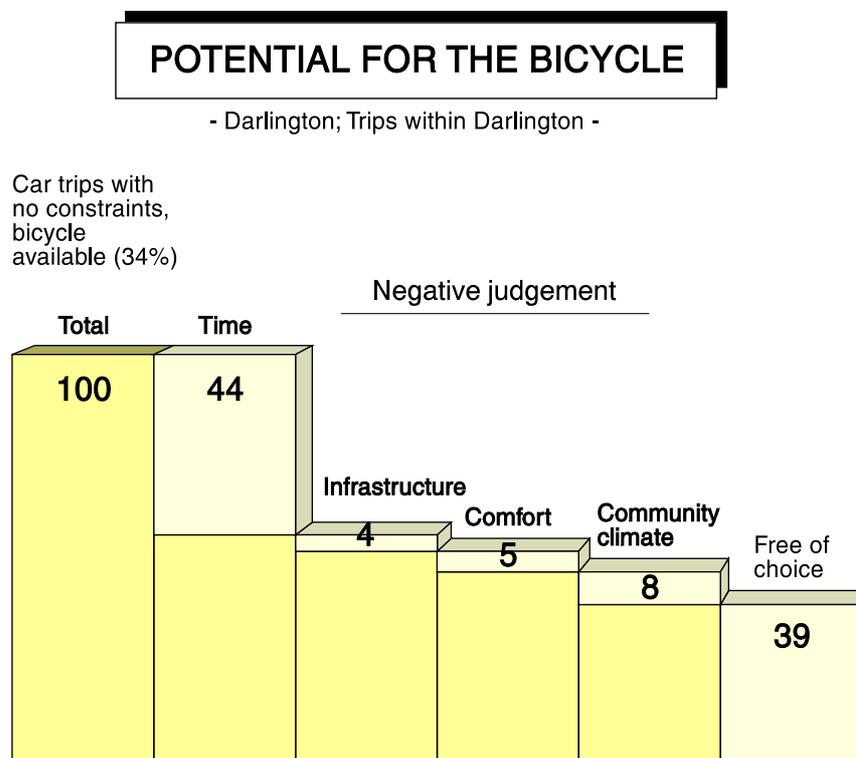
For 34 % of all trips currently undertaken by car (within Darlington) there are no constraints against cycling (e.g. age, luggage), a bicycle is available and cycling is a reasonable alternative[8].

For 44 % of these potential bicycle trips, the main reason given for not cycling was the perceived amount of time it would take, and for 4 % of the trips, the main reason given was the perceived lack of adequate bicycle infrastructure.

In case of 5 % of the trips, lack of comfort (car emissions, safety risk, clothing) was an important reason for not cycling and for 8 % of the trips, there was a generally negative view of cycling as a mode for everyday trips (that is, a negative community climate).

---

[8] The distance assumed to be reasonable to cycle is 6 km.

The remaining 39 % of these potential cycling trips are 'free of choice', so they would be the first target to be convinced to change mode choice by soft measures (motivation, awareness-raising etc.).

5.5   Potential for Walking

The analysis also reveals barriers against walking (see Figure 5.10). In principle one in five car trips within Darlington (21 %) is replaceable by walking Further inquiries revealed reasons why the car is chosen even though there are no constraints and walking is an viable alternative[9].

Figure 5.10: Potential for trips on foot

POTENTIAL FOR TRIPS ON FOOT

- Darlington; Trips within Darlington -

Car trips with
no constraints,
walking
possible (21%)

Negative judgement

Total	Time	Infrastructure	Comfort	Community climate	Free of choice
100	33	2	2	11	52
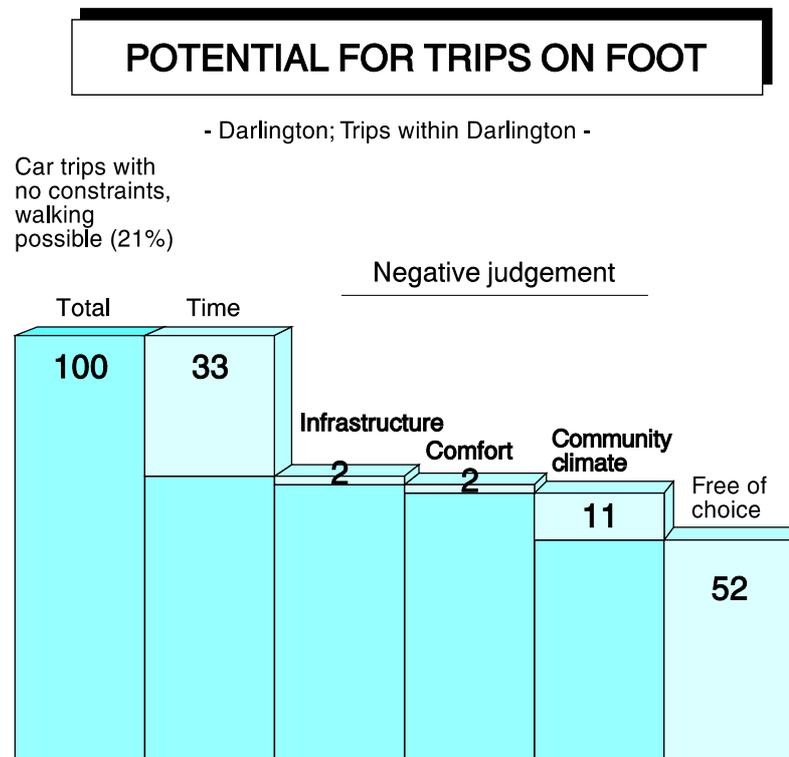
For a third all possible walking trips (33 %) the car is used instead because of perceived time reasons, ie it is subjectively judged that it takes too much time to walk. Perception of poor walking infrastructure and a low estimation of comfort (inconvenience, emissions / noise from cars, etc.) were seen as barriers against walking for only 2 % of the relevant trips. By contrast community climate was a far stronger factor influencing the decision not to walk (11 % of trips). This implies again

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[9] The distance assumed to be reasonable to walk is 2 km, around double the average distance of all walking trips.

that hard infrastructure measures will only have lasting success if they are accompanied by appropriate 'soft' measures to influence people's travel choices.

Of all potential walking trips, 52 % are 'free of choice' meaning that the car is used for no obvious reasons. The potential of free-of-choice trips for walking is stronger than that for cycling and public transport, so the possibility for mode shifts initiated by soft measures is high.

5.6   Conclusion

In Darlington, sustainable travel modes (STM = walking, cycling, public transport) account for 38 % of all trips and motorised private transport (MPM = car / motorbike as driver or passenger) for 62 %.

Figure   5.11: Possible changes of behaviour
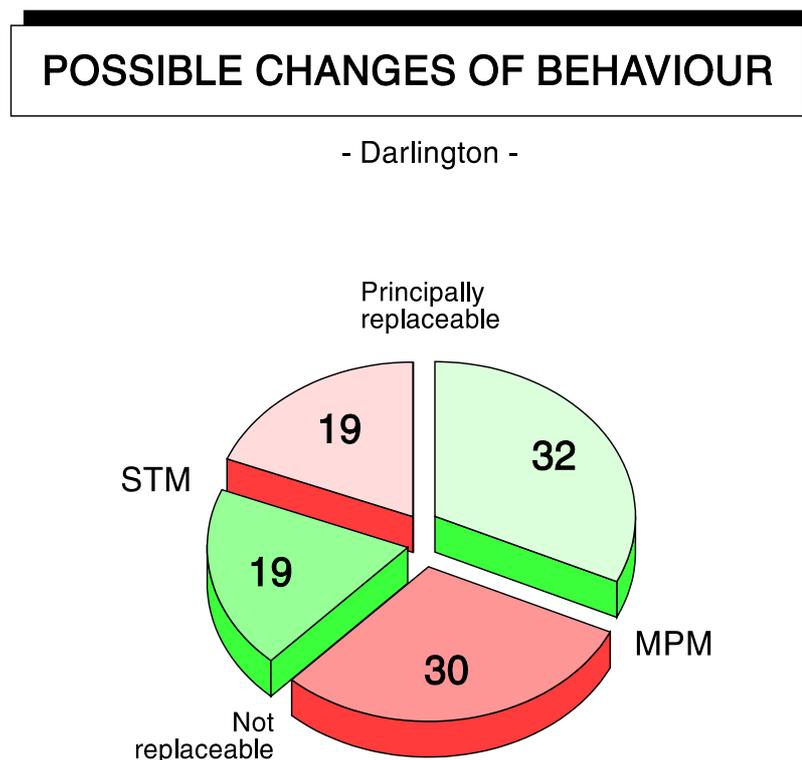
For the 38 % of trips currently made by STM, half (19 %) are not replaceable by motorised private modes for either constraints or system "objective" reasons. For example, a constraint could be that the purpose of the trip is to go for a walk, and an 'objective' choice against using motorised private mode is that a car was not available for the specified trip.

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In principle the other half of trips made by STM (19 %) is replaceable by using a car. These trips are currently undertaken by STM because there are subjective preferences, a negative perception of using the car, or simply choosing not to use private motorised modes.

For the trips currently undertaken by motorised private modes (MPM), there are 30 % where it is not possible to use STM, making the car the only option. These trips are made by MPM because of constraints such as having to transport heavy items, or system "objective" reasons where the trips are due to a lack of adequate supply of the alternative modes.

Nearly a third (32 %) of all trips are currently undertaken by motorised private modes because of "subjective" reasons – lack of awareness and negative perceptions of alternative modes. A change in these subjective influences would have to be achieved to produce a significant shift towards STM. Such a shift could be achieved without any changes to the transport system.

Theoretically then the share of STM could increase to 70 % of all trips, provided that all potentials are completely exhausted. Conversely the share of MPM-trips could gain 19 % of trips from STM-share, raising its share to 81 % of all trips. These are theoretical extremes but they reveal the potential and give information about possible shifts.

A number of information and motivational interventions have proven that about one quarter of this potential for increasing STM use could be easily realised.

ANNEXES:

ANNEX 1:   TRAVEL BEHAVIOUR TABLES

SURVEY DESIGN

OBJECTIVES:

- o Information about factual personal travel behaviour of the town's population

- o Analysis of data and reporting results

- o Baseline for decision-making and subsequent surveys

METHODS:

- o Postal self-administered household survey with telephone support
  (New KONTIV®-Design, travel diary)

- o Collection of complete activity patterns for each person for one sampling day

- o Random sample of the residential population of the Darlington urban area (including people 0 years of age and older)

- o Number of respondents: 4,269 people (net)

- o Response rate: 59 %

- o Sampling days: Monday to Sunday

- o Time of survey: September – November 2004
  The results are cleared of the "Non-Response-Effect" and "Non-Reported-Trips"

- o Database:
  All persons, trips up to 100.0 km

- o Commercial trips are excluded

COMMISSIONER: Darlington Borough Council

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF TABLES (continued)

STRUCTURE DATA

TABLE I

	HOUSEHOLD SIZE

	DARLINGTON
	%
NUMBER OF PERSONS IN THE HOUSEHOLD	
One person	31
Two persons	40
Three persons	15
Four persons	11
Five and more persons	3
Total	100
Average (persons per household)	2.2

Database: 1,993 households

TABLE II

	CARS IN THE HOUSEHOLD

	DARLINGTON
	%
No car	24
One car	50
Two cars and more	26
Total	100
Average (cars per household)	1.1

Database: 1,993 households

TABLE III | OWNERSHIP OF A CAR DRIVER'S LICENSE

	DARLINGTON ALL PERSONS %
Yes	55
No	45
Total	100

	PERSONS OVER 16 YEARS %
Yes	69
No	31
Total	100

Database: 4,269 people

TABLE IV

	GENDER

	DARLINGTON
	%
Male	48
Female	52
Total	100

Database: 4,269 people

TABLE V

AGE CLASSES

	DARLINGTON
	%
Under 6 years	7
6 to under 18 years	16
18 to under 25 years	7
25 to under 45 years	28
45 to under 65 years	25
65 years and older	17
Total	100

Database: 4,269 people

TABLE VI

EMPLOYMENT

	DARLINGTON
	%
Not yet at primary school	5
Home duties	7
Retired / pensioner	21
At school, college, university	20
Looking for work	2
Employed women	21
Employed men	24
Total	100

Database: 4,269 people

BASIC TRAVEL CHARACTERISTICS

TABLE 1

	BASIC TRAVEL CHARACTERISTICS – per day –

	DARLINGTON	
	ALL DAYS	WORKDAYS
Share of mobiles	86 %	89 %
MOBILE PERSONS:		
- Activities	2.01	2.00
- Journeys	1.50	1.48
- Trips	3.51	3.48
- Legs	6.13	5.94
ALL PERSONS:		
- Activities	1.72	1.79
- Journeys	1.29	1.32
- Trips	3.01	3.11
- Legs	5.27	5.29
- Travel time (min)	57	61
- Distance (km)	22	22

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 2

	MOBILE PERSONS BY NUMBER OF TRIPS PER DAY

	DARLINGTON
	%
MOBILE PERSONS WITH	
- one trip	1
- two trips	46
- three trips	10
- four trips	22
- five trips and more	21
Total	100
Share of mobiles (%)	86

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 3

	MOBILE PERSONS BY NUMBER OF JOURNEYS AND ACTIVITIES PER DAY

	DARLINGTON
	%
MOBILE PERSONS WITH	
o 1 journey and	
- 1 activity	47
- 2 activities	9
- 3 activities	4
- 4 activities and over	3

	63
o 2 journeys and	
- 2 activities	18
- 3 activities	5
- 4 activities and over	4

	27
o 3 journeys and	
- 3 activities	5
- 4 activities and over	3

	8
o 4 journeys and over	2
Total	100
Share of mobiles	86

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 4

TIME BUDGET

	DARLINGTON
MOBILE PERSONS	
Time at home	17 h 34
Travel time	1 h 06
Time at destinations	5 h 20
Total	24 h
ALL PERSONS	
Time at home	18 h 28
Travel time	0 h 57
Time at destinations	4 h 35
Total	24 h

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 5

	TRAVEL TIME PER DAY

	DARLINGTON
	ALL PERSONS %
Not out-of-home	14
Up to 15 min	5
16 to 30 min	18
31 to 45 min	13
46 to 60 min	14
61 to 90 min	17
91 to 120 min	9
Over 120 min	10
Total	100
Average travel time (min)	57

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 6

	DISTANCE PER DAY

	DARLINGTON
	ALL PERSONS %
Not out-of-home	14
Up to 3.0 km	10
3.1 to 5.0 km	13
5.1 to 10.0 km	21
10.1 to 20.0 km	15
20.1 to 30.0 km	6
30.1 to 40.0 km	4
40.1 to 50.0 km	4
Over 50.0 km	13
Total	100
Average distance per day (km)	22

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 7

	ACTIVITIES

	DARLINGTON	
	SHARE %	TIME AT DESTINATION OF EACH ACTIVITY
<u>ACTIVITIES</u>		
Work	20	6 h 09
Work-related business	3	1 h 54
Education	10	5 h 26
Shopping	24	1 h 10
Personal business	3	0 h 40
Escort	9	0 h 11
Leisure	31	1 h 45
Total	100	2 h 40

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 8

HOME-RELATED TRIPS

	DARLINGTON
	%
SHARE OF TRIPS	
- from home to out-of-home desti- nations	42
- between out-of-home destinations	16
- back home	42
Total	100
ACTIVITIES OF TRIPS DIRECTLY FROM HOME	
- Work	22
- Work-related business	0[*)]
- Education	11
- Shopping	23
- Personal business	4
- Escort	10
- Leisure	30
Total	100

[*)] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 9

HOME ORIENTATION AND ACTIVITIES AT DESTINATION

	DARLINGTON					
	ACTIVITIES AT DESTINATION – cumulated –					
	TOTAL %	WORK %	EDUCATION %	SHOPPING %	LEISURE %	OTHER %
DISTANCE FROM HOME*)						
Up to 1.0 km	22	10	32	26	23	24
Up to 3.0 km	49	30	67	55	48	57
Up to 5.0 km	75	57	88	85	71	86
Up to 10.0 km	84	69	95	90	81	94
More than 10.0 km	100	100	100	100	100	100
ORIGIN						
From home	74	82	84	70	72	65
Other	26	18	16	30	28	35
Total	100	100	100	100	100	100

*) first activity of journey

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 10

TRIP PURPOSE BY TIME OF THE WEEK

	DARLINGTON			
	TOTAL %	WORKDAY %	SATURDAY %	SUNDAY %
TRIP PURPOSE				
Work	21	26	9	7
Work-related business	2	2	0[*)]	0[*)]
Education	10	14	1	1
Shopping	24	21	42	21
Personal business	3	4	3	1
Escort	9	10	5	4
Leisure	31	23	40	66
Total	100	100	100	100
Share of all trips	100	74	14	12

[*)] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 11	TRIP STARTING BY TIME OF DAY AND TIME OF THE WEEK

	DARLINGTON			
	TOTAL	WORKDAY %	SATURDAY %	SUNDAY %
TIME OF DAY				
Before 5 a.m.	0*)	0*)	1	0*)
5 a.m. - 9 a.m.	17	21	6	4
9 a.m. - 12 a.m.	22	19	31	31
12 a.m. - 3 p.m.	19	17	25	26
3 p.m. - 7 p.m.	32	33	26	27
7 p.m. - 12 p.m.	10	10	11	12
Total	100	100	100	100
Share of all trips	100	74	14	12

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 12

	PATTERNS OF ACTIVITIES PER MOBILE PERSON AND DAY

	DARLINGTON	
	%	cum. %
PATTERNS OF ACTIVITIES		
H – W – H	15	15
H – S – H	11	26
H – E – H	10	36
H – L – H	8	44
H – S – H – L – H	3	47
H – W – H – L – H	2	49
H – L – H – L – H	2	51
H – E – H – L – H	2	53
H – S – H – S – H	1	54
H – S – S – H	1	55
H – W – H – S – H	1	56
Other patterns of activities	44	100

Explanation:

H   = Home
E   = Education
L   = Leisure
S   = Shopping
W   = Work

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 13

	PATTERNS OF ACTIVITIES PER JOURNEY

	DARLINGTON	
	%	cum. %
PATTERNS OF ACTIVITIES		
H – L – H	24	24
H – S – H	19	43
H – W – H	17	60
H – E – H	9	69
H – ES – H	6	75
H – P – H	2	77
H – L – L – H	2	79
H – S – S – H	1	80
H – L – S – H	1	81
H – W – S – H	1	82
H – S – L – H	1	83
Other journeys with two activities	9	92
Other journeys with more than two activities	8	100

Explanation:

H   = Home
E   = Education
ES   = Escort
L   = Leisure
P   = Personal business
S   = Shopping
W   = Work

Database: 4,269 people, 12,685 trips (up to 100 km)

MODE CHOICE

TABLE 14

	MODE CHOICE

	DARLINGTON		
	PER MOBILE PERSON PER DAY	PER PERSON PER DAY	%
<u>MAIN MODE</u>			
Walking	0.89	0.76	25
Bicycle	0.05	0.04	1
Motorbike	0.01	0.01	0[*)]
Car as driver	1.43	1.23	41
Car as passenger	0.72	0.62	21
Public transport	0.41	0.35	12
Total	3.51	3.01	100

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 15

| | MODE CHOICE BY GENDER | | |

	DARLINGTON		
	TOTAL %	MALE %	FEMALE %
<u>MAIN MODE</u>			
Walking	25	23	28
Bicycle	1	3	0[*)]
Motorbike	0[*)]	0[*)]	0[*)]
Car as driver	41	51	32
Car as passenger	21	14	26
Public transport	12	9	14
Total	100	100	100
Share of all trips	100	47	53

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 16

		MODE CHOICE BY AGE				

	DARLINGTON					
	TOTAL %	UP TO 15 YEARS %	16-25 YEARS %	26-45 YEARS %	46-60 YEARS %	61 Y. AND OLDER %
MAIN MODE						
Walking	25	36	31	21	21	25
Bicycle	1	2	4	1	2	1
Motorbike	0*)	0*)	0*)	0*)	0*)	0*)
Car as driver	41	0*)	29	58	57	39
Car as passenger	21	52	16	12	10	17
Public transport	12	10	20	8	10	18
Total	100	100	100	100	100	100
Share of all trips	100	18	9	33	21	19

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 17

	DARLINGTON							
	MODE CHOICE BY EMPLOYMENT							
	TOTAL	NOT YET AT PRIMARY SCHOOL	HOME DUTIES	RETIRED / PENSIONER	AT SCHOOL, COLLEGE, UNIVERSITY	LOOKING FOR WORK	EMPLOYED WOMEN	EMPLOYED MEN
	%	%	%	%	%	%	%	%
MAIN MODE								
Walking	25	39	38	25	34	33	23	15
Bicycle	1	1	1	1	3	0*)	1	3
Motorbike	0*)	-	0*)	0*)	0*)	0*)	0*)	0*)
Car as driver	41	-	31	39	4	51	50	68
Car as passenger	21	57	12	17	43	2	17	8
Public transport	12	3	18	18	16	14	9	6
Total	100	100	100	100	100	100	100	100
Share of all trips	100	5	7	19	17	2	25	25

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 18

	DARLINGTON			
	TOTAL %	WORKDAY %	SATURDAY %	SUNDAY %
MAIN MODE				
Walking	25	27	19	20
Bicycle	1	2	1	1
Motorbike	0[*]	0[*]	0[*]	0[*]
Car as driver	41	41	40	40
Car as passenger	21	17	28	32
Public transport	12	13	12	7
Total	100	100	100	100
Share of all trips	100	74	14	12

[*] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 19		MODE CHOICE BY TRIP PURPOSE						
	DARLINGTON							
	TOTAL	WORK	WORK-RELATED BUSINESS	EDU-CATION	SHOPPING	PERSONAL BUSINESS	ESCORT	LEISURE
	%	%	%	%	%	%	%	%
MAIN MODE								
Walking	25	14	7	46	27	20	24	26
Bicycle	1	3	3	1	1	0*)	0*)	2
Motorbike	0*)	0*)	0*)	0*)	0*)	0*)	0*)	0*)
Car as driver	41	62	85	3	34	44	62	35
Car as passenger	21	11	1	30	20	22	10	29
Public transport	12	10	4	20	18	14	4	8
Total	100	100	100	100	100	100	100	100
Share of all trips (%)	100	21	2	10	24	3	9	31

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 20

	TIME OF DAY BY MODE CHOICE						
	DARLINGTON						
	TOTAL %	WALKING %	BICYCLE %	MOTOR-BIKE %	CAR AS DRIVER %	CAR AS PASSENGER %	PUBLIC TRANSPORT %
STARTING TIME OF TRIP							
Before 5 a.m.	0*)	0*)	2	0*)	0*)	1	1
5 a.m. - 9 a.m.	17	19	23	9	18	13	17
9 a.m. - 12 a.m.	22	24	15	22	20	21	26
12 a.m. - 3 p.m.	19	18	13	18	19	18	24
3 p.m. - 7 p.m.	32	30	34	36	32	34	27
7 p.m. - 12 p.m.	10	9	13	15	11	13	5
Total	100	100	100	100	100	100	100
Share of all trips (%)	100	25	1	0*)	41	21	12

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 21

	MODE CHOICE BY PARTICIPATION						

	DARLINGTON						
	PARTICIPATION GROUPS						
	TOTAL %	WALKING %	BICYCLE %	MOTOR-BIKE %	CAR AS DRIVER %	CAR AS PASSENGER %	PUBLIC TRANSPORT %
MAIN MODE							
Walking	25	63	16	16	10	17	21
Bicycle	1	1	53	0[*]	1	0[*]	1
Motorbike	0[*]	0[*]	0[*]	55	0[*]	0[*]	0[*]
Car as driver	41	16	19	29	83	9	5
Car as passenger	21	12	5	0[*]	4	69	10
Public Transport	12	8	7	0[*]	2	5	63
Total	100	100	100	100	100	100	100
Share of all persons	(...)	30 %	2 %	0[*]	36 %	25 %	18 %

[*] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 22

	MODE CHOICE – all modes used per trip –

	DARLINGTON
	%
ALL MODES	
Walking	84.3
Bicycle	1.5
Bike + Ride	0.0[*]
Motorbike	0.2
Private car as driver	40.2
Company-car as driver	0.4
Other mot. vehicle as driver	0.1
Car as passenger - family car - other car - company car	 15.4 5.3 0.0[*]
Bus	10.6
Train	0.7
Work- / School bus	0.2
Park + Ride	0.1
Taxi	0.7
Other	0.0[*]
Total (Multiple responses)	159.7

[*] less than 0.05 %

Database: 4,269 people, 12,685 trips (up to 100 km)

DURATION AND TRIP DISTANCE

TABLE 23

	DURATION, DISTANCE, SPEED PER TRIP[*]

	DARLINGTON		
	DURATION (min)	TRIP DISTANCE (km)	SPEED (km/h)
MAIN MODE			
Walking	16	1.2	4
Bicycle	20	3.7	11
Motorbike	25	11.7	28
Car as driver	19	10.1	32
Car as passenger	18	9.0	30
Public transport	31	7.1	14
Total	19	7.2	23

[*] "Door-to-door"

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 24

<table>
<tr><td></td><td colspan="2">DURATION AND DISTANCE PER PERSON AND DAY</td></tr>
<tr><td></td><td colspan="2">DARLINGTON</td></tr>
<tr><td></td><td>(min)</td><td>(km)</td></tr>
<tr><td><u>MAIN MODE</u></td><td></td><td></td></tr>
<tr><td>Walking**)</td><td>21</td><td>1.5</td></tr>
<tr><td>Bicycle</td><td>1</td><td>0.3</td></tr>
<tr><td>Motorbike</td><td>0*)</td><td>0.1</td></tr>
<tr><td>Car as driver</td><td>19</td><td>12.2</td></tr>
<tr><td>Car as passenger</td><td>9</td><td>5.4</td></tr>
<tr><td>Public transport</td><td>7</td><td>2.2</td></tr>
<tr><td>Total</td><td>57</td><td>21.7</td></tr>
</table>

*) less than 0.5 minutes
**) Including walking legs of bicycle-, motorbike-, car- and public transport-
   trips

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 25

| | MODAL-SPLIT PER TRIP, PER DURATION AND PER TRIP DISTANCE |

	DARLINGTON		
	PER TRIP	PER DURATION	PER DISTANCE
MAIN MODE			
Walking[**]	25	37	7
Bicycle	1	2	1
Motorbike	0[*]	0[*]	1
Car as driver	41	33	56
Car as passenger	21	16	25
Public transport	12	12	10
Total	100	100	100
Non-motorised modes	26	39	8
Motorised private modes	62	49	82
Public transport	12	12	10
Total	100	100	100
Occupancy[***]	1.5	1.5	1.4

[*] less than 0.5 %
[**] Including walking legs of bicycle-, motorbike-, car- and public transport-trips
[***] In relation to all cars (private and company cars)

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 26	TRIP DISTANCE BY MODE – cumulated –						
	DARLINGTON						
	TOTAL %	WALKING %	BICYCLE %	MOTOR-BIKE %	CAR AS DRIVER %	CAR AS PASSENGER %	PUBLIC TRANSPORT %
TRIP DISTANCE							
Up to 1.0 km	21	59	28	5	7	11	6
Up to 3.0 km	47	91	59	10	29	37	34
Up to 5.0 km	74	98	86	45	61	68	75
Up to 10.0 km	84	99	92	66	74	80	89
Up to 50.0 km	97	99	100	100	96	96	96
Total	100	100	100	100	100	100	100
Share of all trips	100	25	1	0[*]	41	21	12
Average distance (km)	7.2	1.2	3.7	11.7	10.1	9.0	7.1

[*] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 27

	DARLINGTON					
	TOTAL %	UP TO 1.0 KM %	1.1 - 3.0 KM %	3.1 - 5.0 KM %	5.1 - 10.0 KM %	OVER 10.0 KM %
MAIN MODE						
Walking	25	70	32	6	1	0[*)]
Bicycle	1	2	2	2	1	1
Motorbike	0[*)]	0[*)]	0[*)]	0[*)]	0[*)]	0[*)]
Car as driver	41	14	34	49	56	65
Car as passenger	21	11	20	25	25	26
Public transport	12	3	12	18	17	8
Total	100	100	100	100	100	100
Share of all trips	100	21	26	27	10	16

MODE CHOICE BY DISTANCE

[*)] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

CAR USAGE

TABLE 28

| | CAR USAGE |

	DARLINGTON	
	PER PRIVATE CAR / DAY	"MOBILE" CARS
Usage (%)	77	(100)
Trips	2.45	3.18
Duration (min)	42[*]	55[*]
Distance (km)	25[*]	32[*]
Occupancy per trip - All days - Workdays		1.5 1.4
Drivers per car and day		1.1
Number of journeys per day		1.32
Parking per day (out-of-home destinations)		1.86

[*] Pure car-trip-duration without walking stages

Database: 2,111 private cars, 5,607 private car trips (up to 100 km)

TABLE 29

PRIVATE CAR USAGE BY DURATION AND TRIP DISTANCE[*)]

	DARLINGTON
	"MOBILE" CARS
Duration	0 h 55
Parking time at home	18 h 08
Parking time at destination	4 h 57
Total	24 h

	ALL PRIVATE CAR TRIPS – cumulated –		
	SHARE %	DURATION (min)	TRIP DISTANCE (km)
Trips up to 1 km	7	7	1
Trips up to 3 km	29	9	2
Trips up to 5 km	61	12	3
Trips up to 10 km	74	13	4
Trips up to 50 km	96	17	8
Total	100	19	10

[*)] "Door-to-door"

Database: 2,111 private cars, 5,607 private car trips (up to 100 km)

SPATIAL ORIENTATION

TABLE 30

| | SPATIAL ORIENTATION |

	DARLINGTON
	%
SPATIAL ORIENTATION	
Trips entirely within Darlington[*]	77
Trips to / from Darlington	20
Trips outside Darlington	3
Total	100

[*] Urban area of Darlington

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 31

	MODE CHOICE BY SPATIAL ORIENTATION			
	DARLINGTON			
	SPATIAL DISTRIBUTION			
	TOTAL %	TRIPS ENTIRELY WITHIN DARLINGTON %	TRIPS TO/FROM DARLINGTON %	TRIPS OUTSIDE DARLINGTON %
MAIN MODE				
Walking	25	31	5	16
Bicycle	1	2	1	1
Motorbike	0[*)	0[*)	0[*)	0[*)
Car as driver	41	35	60	55
Car as passenger	21	19	25	23
Public transport	12	13	9	5
Total	100	100	100	100
Average trip-distance (km)	7.2	2.8	23.0	14.3

[*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TRAVEL BEHAVIOUR BY WARDS

	DARLINGTON										
	Total (all wards)	Bank Top	Central	Cockerton East	Cockerton West	College	East-bourne	Faverdale	Harrow-gate Hill	Haughton East	Haughton North
TABLE 32 – Part 1 –	**BASIC TRAVEL CHARACTERISTICS** – per ward per day –										
Share of mobiles	86 %	86 %	88 %	86 %	84 %	86 %	79 %	92 %	92 %	77 %	90 %
MOBILE PERSONS:											
- Activities	2.0	1.8	2.0	1.9	1.8	2.1	2.2	2.1	1.9	2.2	2.0
- Journeys	1.5	1.5	1.5	1.5	1.5	1.5	1.7	1.4	1.4	1.4	1.5
- Trips	3.5	3.3	3.5	3.4	3.3	3.6	3.9	3.5	3.3	3.6	3.5
ALL PERSONS:											
- Activities	1.7	1.5	1.7	1.7	1.5	1.8	1.7	2.0	1.8	1.7	1.8
- Journeys	1.3	1.3	1.4	1.2	1.3	1.3	1.4	1.3	1.2	1.1	1.3
- Trips	3.0	2.8	3.1	2.9	2.8	3.1	3.1	3.3	3.0	2.8	3.1
- Travel time (min)	57	55	64	52	56	60	51	71	67	54	59
- Distance (km)	22	18	19	18	16	26	17	40	29	19	29

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 32 – Part 2 –	BASIC TRAVEL CHARACTERISTICS – per ward per day – (continued)										
	DARLINGTON										
	Total (all wards)	Haughton West	Hummers- knott	Lascelles	Lingfield	Mowden	North Road	Northgate	Park East	Park West	Pierre- mont
Share of mobiles	86 %	88 %	90 %	87 %	83 %	88 %	90 %	89 %	81 %	81 %	86 %
MOBILE PERSONS:											
- Activities	2.0	2.0	2.0	1.7	1.9	2.2	2.0	2.1	2.1	2.2	1.9
- Journeys	1.5	1.5	1.5	1.4	1.5	1.7	1.5	1.6	1.5	1.6	1.4
- Trips	3.5	3.5	3.5	3.1	3.4	3.9	3.5	3.7	3.6	3.8	3.3
ALL PERSONS:											
- Activities	1.7	1.7	1.8	1.5	1.6	1.9	1.8	1.9	1.7	1.8	1.6
- Journeys	1.3	1.4	1.3	1.2	1.2	1.5	1.3	1.4	1.2	1.3	1.3
- Trips	3.0	3.1	3.1	2.7	2.8	3.4	3.1	3.3	2.9	3.1	2.9
- Travel time (min)	57	58	63	58	63	61	56	55	52	63	61
- Distance (km)	22	23	30	16	26	24	18	16	19	24	22

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 33
– Part 1 –

	DARLINGTON										
	Total (all wards) %	Bank Top %	Central %	Cockerton East %	Cockerton West %	College %	East-bourne %	Faverdale %	Harrow-gate Hill %	Haughton East %	Haughton North %
ACTIVITIES											
Work	20	23	23	26	21	18	15	24	19	19	24
Work-related business	3	0*)	1	3	1	6	5	3	2	3	5
Education	10	8	8	12	11	9	10	13	7	15	7
Shopping	24	27	20	25	28	23	18	18	29	22	22
Personal business	3	3	3	3	4	5	6	1	4	4	2
Escort	9	5	8	8	11	10	15	16	10	8	7
Leisure	31	34	37	23	24	29	31	25	29	29	33
Total	100	100	100	100	100	100	100	100	100	100	100

ACTIVITIES PER WARD

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 33
– Part 2 –

ACTIVITIES PER WARD (continued)

	DARLINGTON										
	Total (all wards) %	Haughton West %	Hummers-knott %	Lascelles %	Lingfield %	Mowden %	North Road %	Northgate %	Park East %	Park West %	Pierre-mont %
ACTIVITIES											
Work	20	20	20	21	20	15	21	18	19	17	20
Work-related business	3	2	2	2	2	4	2	1	4	5	2
Education	10	7	11	14	10	8	12	11	6	10	9
Shopping	24	19	20	28	27	26	28	29	20	24	28
Personal business	3	2	5	2	2	5	4	4	2	4	2
Escort	9	10	12	6	12	12	8	9	9	9	4
Leisure	31	40	30	27	27	30	25	28	40	31	35
Total	100	100	100	100	100	100	100	100	100	100	100

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 34
– Part 1 –

	DARLINGTON										
	Total (all wards) %	Bank Top %	Central %	Cockerton East %	Cockerton West %	College %	East-bourne %	Faverdale %	Harrow-gate Hill %	Haughton East %	Haughton North %
MAIN MODE											
Walking	25	24	32	23	30	32	22	14	20	19	17
Bicycle	1	5	1	1	1	1	1	1	1	1	2
Motorbike	0*)	0*)	1	0*)	1	0*)	0*)	0*)	0*)	0*)	0*)
Car as driver	41	32	38	45	29	45	40	57	39	37	49
Car as passenger	21	16	12	24	14	19	22	24	25	29	22
Public transport	12	23	16	7	25	3	15	4	15	14	10
Total	100	100	100	100	100	100	100	100	100	100	100

MODE CHOICE PER WARD

*) less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 34
– Part 2 –

	DARLINGTON										
	Total (all wards) %	Haughton West %	Hummers-knott %	Lascelles %	Lingfield %	Mowden %	North Road %	Northgate %	Park East %	Park West %	Pierre-mont %
MAIN MODE											
Walking	25	17	20	35	24	27	26	40	25	23	33
Bicycle	1	1	1	5	1	2	0[*]	0[*]	2	1	2
Motorbike	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]	0[*]
Car as driver	41	44	51	32	41	45	41	32	37	51	41
Car as passenger	21	26	23	13	19	20	20	17	23	20	17
Public transport	12	12	5	15	15	6	13	11	13	5	7
Total	100	100	100	100	100	100	100	100	100	100	100

MODE CHOICE PER WARD (continued)

[*] less than 0.5 %

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 35
– Part 1 –

	DARLINGTON										
SPATIAL ORIENTATION PER WARD											
	Total (all wards) %	Bank Top %	Central %	Cockerton East %	Cockerton West %	College %	East-bourne %	Faverdale %	Harrow-gate Hill %	Haughton East %	Haughton North %
Trips within ward	17	13	17	14	22	22	21	8	19	18	16
Trips to/from town centre	15	19	18	18	20	14	18	9	13	12	11
Other trips within Darlington	45	45	51	53	44	36	37	52	39	39	42
Trips to/from Darlington	20	21	13	14	12	25	22	25	26	20	25
Trips outside Darlington	3	2	1	1	2	3	2	6	3	11	7
Total	100	100	100	100	100	100	100	100	100	100	100

Database: 4,269 people, 12,685 trips (up to 100 km)

TABLE 35
– Part 2 –

	SPATIAL ORIENTATION PER WARD (continued)										
	DARLINGTON										
	Total (all wards) %	Haughton West %	Hummers-knott %	Lascelles %	Lingfield %	Mowden %	North Road %	Northgate %	Park East %	Park West %	Pierre-mont %
Trips within ward	17	15	14	21	16	25	17	20	13	12	15
Trips to/from town centre	15	12	15	16	12	11	11	16	20	12	10
Other trips within Darlington	45	48	43	45	39	44	50	44	46	48	56
Trips to/from Darlington	20	23	24	17	30	17	20	17	19	22	17
Trips outside Darlington	3	2	4	1	3	3	2	3	2	6	2
Total	100	100	100	100	100	100	100	100	100	100	100

Database: 4,269 people, 12,685 trips (up to 100 km)

General terminology

The following definitions refer to the terminology used in the tables.

Activity	Main business carried out in one spatial setting out-of-home.
Commercial (trip)	Trips undertaken exclusively as professional services (as e. g. taxi-driver, freight traffic) are not included in the presented results.
Household	All people who occupy the same housing unit.
Journey	A sequence of trips starting and ending at home to do one or more activities.
Leg	(Also referred to as a „stage" or „unlinked trip"). Portion of a trip, conducted on a single mode of transportation (including walking). If there is a change of mode within a trip, a new leg starts. A trip can consist of one or more legs: the movement by (main) mode, (walking) legs to or from parking space on public ground, access to or from PT stops. Changing between two modes of PT and waiting for a PT mode can also be considered as a leg of a trip.
Mobile persons	Persons undertaking at least one trip during the sampling day.
Mode	The means of transport used for one trip including private and public modes as well as walking; for one trip generally more than one mode can be used. If more than one mode is used for one trip, a main mode (of the trip) is determined according to the following ranking: Public Transport (train, bus, work-/schoolbus, taxi) – motorised private modes (car, motorbike) – non-motorised modes (bicycle, walking).
Participation	Usage of a certain "main mode" at the travel day. If one person is using a certain main mode at least for one trip, this person belongs to the respective participation group. If one person is using different main modes at the travel day, this person is belonging to different participation groups.
Persons	All members of the surveyed households.
Spatial orientation	Referring to origin and destination a spatial orientation for all trips can be given. It can be distinguished between • trips entirely within one area • trips from one area to another area and vice versa • trips outside one area
Speed	Average speed (door-to-door) calculated by distance and duration.
Trip	Movement generated by an out-of-home activity plus trips back home. For one trip more than one mode can be used.

(Trip) distance   Door-to-door distance of a trip (as reported by the respondent). The analysis of day-to-day mobility excludes trips of more than 100 km (around 2 % of all trips) to avoid skewing any distance-related indicators.

(Trip) duration   Duration between the start of a trip and the arrival at the destination (based on the time starting a trip and arriving at the destination both reported by the respondent).

(Trip) purpose   Reason for conducting a trip; trips back home have the same reason as trips from home to the corresponding activity.

Trip purpose

The purpose of a trip is normally taken to be the activity at the destination, unless that destination is 'home' in which case the purpose is defined by the activity at the origin of the trip. Purposes include:

Education   Trips to school including nursery school and further / higher education by full-time students, students on day-release and part-time students following vocational courses.

Escort   When the traveller has no purpose of his or her own, other than to escort or accompany another person; for example, taking a child to school.

Leisure   Visits to meet friends, relatives, or acquaintances, both at someone's home or at a pub, restaurant, etc; religious activities, all types of entertainment or sport, clubs, and non-vocational evening classes, political meetings, recreation, leisure walks, day trips, holidays (within UK) etc.

Personal business   Visits to services e.g. hairdressers, launderettes, dry-cleaners, betting shops, solicitors, banks, estate agents, libraries, or for medical consultations or treatment.

Shopping   All trips to shops or from shops to home, even if there was no intention to buy.

Work   Commuting including trips to usual place of work from home, or work to home and trips to work from a place other than home or in the course of work, e.g. coming back to work from going to the shops during a lunch break.

Work-related business   Personal trips in course of work.

ANNEX 3:   FUNDAMENTAL PRINCIPLES OF THE POTENTIAL ANALYSIS

Researching reasons for mobility behaviour has concerned decision-makers, planners and scientists for a long time. Surveys in the transport field deal with various aspects of the mobility of people and therefore with a type of behaviour that appears to be simple and easily explained but is, in reality, very complex and sophisticated.

Serious empirical studies must adjust to the world they wish to depict and cannot expect that this world will adapt itself to their simplifying methods. For example, even ascertaining the reasons which determine mode choice becomes a comparatively complicated matter which requires reliable information from very diverse data fields.

The personal circumstances of an individual will influence and constrain the choice of a certain mode of transport (data field: socio-demography), a reasonable possibility for using this mode of transport must exist (data field: transport systems), the persons involved must perceive this option accurately (data field: perception), and they must be willing to use this option (data field: attitudes).

This means that the existence of an option alone is not enough if people do not perceive it or their personal circumstances prevent its use: a positive attitude towards a mode of transport does not lead to its use when no relevant option is available, etc. However the starting point for travellers' behavioural decisions is, in any case, the world they perceive, irrespective of how (in-) complete and / or (in-) accurate this perception is. If one wants to understand the behaviour of human beings, logic dictates that not only knowledge of the prevailing (external and personal) conditions for their decision is required, but knowledge of their perceived world(s) as well.

Therefore, even the description – let alone the explanation and prediction – of mode choice becomes a task of considerable complexity. In addition, it is made even more difficult by the fact that daily, weekly, and monthly every individual is confronted by many different decision-making situations with regard to their travel mode choices that involve varying constellations (sets) and combinations of the above data fields: simplifying approaches which only deal with the "unit person" are therefore of little help in the description, explanation, or prediction of mode choice.

A perceptible raising of the quality standard for mobility research is becoming more and more important; mobility research is becoming increasingly recognised as an aid to decision-making in many planning fields. However, the resulting link to application brings with it the demand for the provision of reliable decision-making assistance. This decision-making assistance needs to be of the highest quality in order to safeguard the investment of considerable financial resources and create prevailing conditions for our everyday life whose consequences may still be felt by our children and grandchildren. Practical mobility research is anything but experimentation without consequences in an encapsulated academic playground. Therefore our efforts must be directed above all to a constant improvement in our methodological standards and practices.

In spite of the complexity of our research topic (mobility), the application of common sense often suffices. It requires no great scientific effort to recognise, for example, that the use of an alternative mode of transport is only possible: if there is no constraint requiring the use of the present mode, if a suitable alternative mode is actually available; if the person involved is also adequately informed about this alternative; if she/he thinks the use of this alternative is possible with regard to travel time, travel costs, travel comfort (and similar usage characteristics); and if she/he has no reservations in principle against this alternative and finally chooses it from the available alternatives.

From this (conceptual) model of mode choice, data requirements can then be formulated. These data requirements will include various types of primary and secondary data. On close examination, it will quickly become clear that even the primary data can only be obtained through a combination of different (partial) surveys. If reliable data is to be collected, different survey methods – with each being particularly suitable for its respective data field – must be used.

Once the data is collected and recorded, careful analyses must be employed to determine if the conceptual assumptions that have led to the development of the underlying conceptual model can be confirmed or, if necessary, need to be modified. Only then can the mathematical/statistical information of this model begin.

Many models predicting transport behaviour are based on empirically measured behaviour patterns. They determine the framework conditions and then try to derive a statistical correlation between framework conditions and behaviour to infer the behaviour under framework conditions. Subjective scopes of action are not taken into account nor are they replaced by assumptions ("experienced-based assumptions").

Such models usually just predict status-quo behaviour under new framework conditions.

Transport decision makers can neither develop innovative solutions, nor understand the potential to better use existing systems by using models of the existing system. They need to know the extent to which existing behaviour cannot be changed, which measures will (not) achieve the predicted effects, and how such measures are to be valued beyond behaviour change.

Socialdata developed the "situational approach" as a model to measure the real potential (and limits) for travel behaviour change.

The situational approach offers not only everything that is asked for by an "individual behaviour model", but also has some advantages compared to other versions of this "model family" e.g.:

- The approach is based on actual behaviour and achieved changes in behaviour (therefore it is possible to make a projection of the "total behaviour" for a given population).

- With this information, factors which determine behaviour are recorded (through this it is possible to estimate the impact of measures, which were not subject of the initial project).

- The recording of all "objective" and subjective factors (through this it is possible to get information about car trips that are constrained by, lack of an alternative for example and also about the trips where "soft policies" (information and motivation) have the potential for behavioural changes to real alternatives).

- By testing every trip against the actual system for alternatives to the car and the "objective" constraints against using the alternatives (distance to / from the public transport stop, actual travel time etc.), it becomes possible to evaluate the actual extent of information in comparison to the perception of these alternatives.

- A summary of all factors in a single model structure makes it possible to evaluate the impacts of opposing and complementary factors.

- A strict reference to the unit family / household. This reference enables analysis to determine the influence of individual behaviour on the behaviour of other members of the family. Also to estimate the direction and impact of possible secondary reactions (e.g. if a working car driver changes to public transport, the other members of the family may use the spare car and not use public transport anymore).

The situational approach assumes, simply, that each individual has a special scope of behaviour as a result of his / her environment ("objective" situation). Each individual experiences these "objective" situations – the transportation infrastructure they can access, the constraints and options of the individual and their household which can be socio-demographically deduced, and social values, norms and options which are pertinent to travel behaviour.

Each individual experiences these "objective" situations differently, thus creating individually different subjective situations. The subjective situations differ from objective situations due to perceptions being incomplete or distorted - consciously or unconsciously. The extent of deviation depends upon the individual person and their specific experiences. Individual decisions are made in these subjective situations. Subjective situations have a major influence on determining behaviour.

The situational approach is not limited to individual behavioural situations, such as factors influencing an individual's free choice. The approach also recognises the fact that individual (behavioural) decisions are made in accordance with a personal, subjective logic that is frequently at odds with the researcher's, planner's or politician's "rationality". This does not imply that the individual does not act rationally – only that their logic is also subjective.

The influences and processes of the "situational approach" can be simplified as follows:

```
┌─────────────────────────────────────────────────────────┐
│                                                         │
│   ┌──────────────┐          ┌──────────────┐            │
│   │  Individual  │    ↔     │  Framework   │            │
│   │  situation   │          │              │            │
│   └──────────────┘          └──────────────┘            │
│          ↓                         ↓                    │
│   ┌──────────────────────────────────────────┐         │
│   │             Perception                    │         │
│   │                ↓                          │         │
│   │             Evaluation                    │         │
│   │                ↓                          │         │
│   │        Behaviour  Disposition             │         │
│   └──────────────────────────────────────────┘         │
│                        ↓                                │
│   ┌──────────────────────────────────────────┐         │
│   │             Individual                    │         │
│   └──────────────────────────────────────────┘         │
│                                                         │
└─────────────────────────────────────────────────────────┘
```
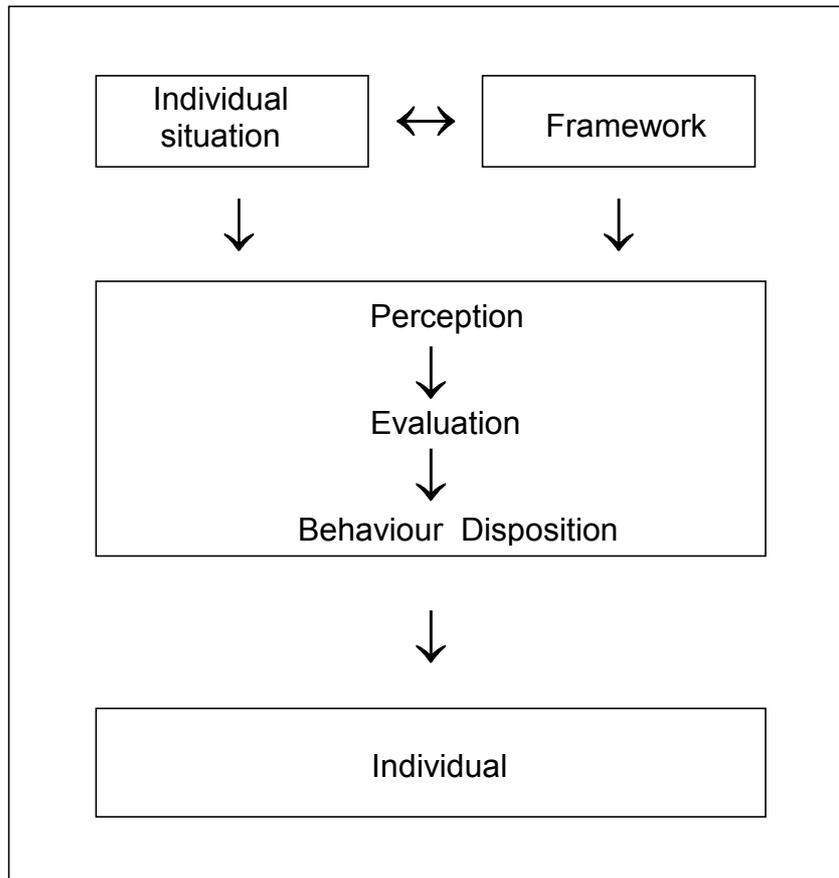
Individual situation includes primarily socio-demographic variables like age, sex, occupation, etc; framework is infrastructural (system measures) as well as "legislative" parameters (e.g. parking rules).

Therefore behavioural change measures are based on "system measures" (hard policies) as well as on "measures on the mind" (soft policies).

Simplified, five different potential groups can be derived.

SITUATIONAL APPROACH

AREA	DIMENSION(S)	POTENTIAL-GROUP
Individual situation	Constraints	Constraints (CON)
Framework conditions	"Objective" choice operation	No connection (SYS)
Perception	Information Subjective disposition	Lack of information / acceptance (PAW)
Evaluation	Time Comfort Costs	Negative subjective evaluation (SUB)

Behavioural disposition	With "objective" and subjective choice	Free of choice (FOC)

Group CON: Trips with constraints because of individual situation where there is no behavioural alternative (e.g. car use because of business reasons).

Group SYS: Trips without behavioural alternatives because of infrastructural constraints (e.g. no adequate public transport connection available).

Group PAW: Trips with "objective" behavioural alternatives but these options are excluded in the individuals subjective filter (e.g. persons without sufficient information about existing public transport alternative, prejudice against public transport etc.)

Group SUB: Trips with an objective alternative and with an awareness about the alternative, but this existing option is assessed negatively (e.g. negative perception of travel time).

Group FOC: Trips with a real alternative and a subjective awareness of the alternative, but where the option is not currently chosen.

Each of these five groups has potential for change – in this context three different measures are important:

- System measures for group SYS. This includes also restrictive measures against other modes.

- Public Awareness measures for group PAW.

- "Conventional" marketing and information campaigns for group SUB and FOC.

(Behaviour change for group CON cannot be easily achieved, so it is not considered for further actions).

These five groups exist because of multiple individual situations and perceptions, which have an influence on the mode choice, for every single trip.

Special in-depth research involving intensive dialogue with each household, with each member having previously completed a travel diary, revealed the above mentioned reasons for behaviour. This method of in-depth research is more reliable than the common approach of asking non-users to state "why" they don't choose alternatives to the car.

Mode choice is determined by several of the influences identified by the research. The combinations of influences need to be considered to identify the potential for change for each of the transport measures available. A group of people/trips with a system constraint (SYS) may also have a negative perception regarding public transport (PAW), so a system solution alone will be insufficient to change mode choice.

SUSTAINABLE TRAVEL TOWNS

TRAVEL BEHAVIOUR RESEARCH

PROGRAMME IN DARLINGTON

Field Report

CONTENTS

SUMMARY

Socialdata has completed the fieldwork for the travel behavioural research as part of Darlington's Sustainable Travel Town programme.

The research consists of behavioural travel surveys and in-depth interviews. Together these will provide a comprehensive database on personal travel behaviour, detailed information about the potential for travel behaviour change, attitudes towards local transport issues, and baseline data against which the effects of planned STT interventions can be evaluated.

The household travel behavioural survey covered a representative sample of Darlington's inhabitants and finished with a net sample of nearly 4,269 people (well above the contract requirement of 4,000), resulting in an overall 59 % response rate.

The in-depth research is also finished; personal interviews have been completed with 406 people (agreed net sample was 400).

Overall, people in Darlington have responded positively to the travel surveys. There have been relatively few complaints received by *Socialdata* concerning the survey process.

It should be noted that the time-frame for conducting this research was extremely tight and a well-planned approach and a strict day-to-day management were needed to complete this task in the time available.

1   METHODOLOGY

1.1   Behavioural Travel Survey

The methodology used by *Socialdata* is a mail-back diary technique, proven to be the most reliable method for collecting data on travel behaviour (known as "New KONTIV Design"). It consists of a questionnaire that is sent to each household in the survey sample, together with a set of individual travel diaries for a nominated day of the week for all household members. This includes households completing travel diaries for all seven days of the week.

The survey form is designed to collect information on individual activities performed at all out-of-home destinations on the nominated travel day. The questionnaire design allows respondents to report their activities in their own words, helping to increase the quality and accuracy of the data. For the STT programme additional telephone calls were carried out as follow up to the surveys to allow detailed data on trip stages (including walking) to be collected.

The sampling strategy for the survey was determined by the requirement to get a representative picture of mobility for the population of Darlington and to carry out analysis at a ward level. Therefore:

- the survey area covered all residential households in Darlington (total population: 85,000 people)

- the sample was randomly selected from this household population and stratified to ensure a sufficient sample size to provide reliable data at ward level; and

- the sample included households with and without known telephone numbers (the latter requiring a modified survey procedure using repeat postal contact in place of telephone motivation).

The sample was drawn from a commercially available database of postal addresses and telephone numbers, AFD Names and Numbers®, excluding households registered with the Mailing and Telephone Preference Services. This database incorporates the Royal Mail Postal Address File (PAF), the most up-to-date and complete address-only database in the UK.

1.2 In-Depth Survey

A sub-sample from the behavioural survey has been selected for further in-depth research to collect information about awareness and attitudes, reasons for mode choice and potentials for change. This sample again is constructed that it covers the whole town and was stratified that it gives enough a sufficient basis for the different modes. This is based on face-to-face interviews. These personal interviews were conducted at the respondent's home by interviewers using an interactive technique.

2 TIMETABLE

The behavioural survey was planned and implemented as a series of eight waves splitting the total sample in eight sub-samples to make the survey process manageable in the time available and to cover a longer period of time. The survey started at end of September with the sending of the first announcement letters. The first travel day of the first wave was scheduled for Monday September 27th, the last one for Sunday November 21st. Including the reminder phases the survey covered the period of the calendar weeks 40 till 52 of 2004.

The follow-up telephone calls on the trip stages were conducted the same day when a questionnaires was returned. In some cases several calls per household were necessary to reach the persons concerned.

The in-depth interviews could start only on completion of the behavioural interviews which were needed as an input for it. So the fieldwork started in the first week of November and was completed in the beginning of January 2005.

3 FIELDWORK

3.1 Behavioural Travel Survey

The fieldwork was carried out from *Socialdata's* office in Bristol. The following step-by-step process was used to conduct the surveys for each wave of the process:

- Mailing of an announcement letter (bearing the Darlington City Council logo and an official signature) to all households in the gross sample;

- Mailing of the survey forms and the official covering letter (as above) to all households in the gross sample;

- Households were contacted by phone (if possible) on their nominated travel day to motivate them to respond to the survey;

- Mailing of a reminder letter (bearing the Darlington City Council logo and an official signature) to all households who fail to respond within one week;

- Mailing of a second reminder letter (this time on *Socialdata* headed paper and signed by the *Socialdata* fieldwork manager) to non-responding households a week later;

- Reminder telephone calls to non-responding households to offer support in completing the forms and to motivate them and return them.

- A new mailing of the questionnaire to non-responding households (including those without available telephone numbers).

- A further reminder mail-out to non-responding households (as above).

- New mailing of the questionnaire to those households who asked for it in the reminder actions.

A number of other steps were taken to ensure data quality and high response rates:

- All envelopes were personally addressed to the household and carried a Royal Mail stamp rather than a franking mark;

- A free phone number was included on the front of the survey form to enable residents to contact *Socialdata* with any queries;

- All returned travel diaries were checked by *Socialdata* staff to see if they were complete and correctly filled out. If they contained implausible statements or clarification is needed, households were phoned to check the information given ('completing').

- Additional controls happened in the process of destination coding and data-entry. If inconsistencies were found the questionnaire was sent back to the call-centre for further exploration.

After this completing process, the responses of each household are checked for relevance for the subsequent 'exploration' of trip stages. This exploration was carried out by phone and reached 89 % of the sub-sample of around 1,400 people.

This survey was implemented by work teams each responsible for a different step. The whole process was co-ordinated by a field-manager.

Some figures on the different survey mail-outs illustrate the scale of the operation:

- over 4,000 announcement letters
- nearly 4,000 mail-outs
- nearly 6,000 reminders
- about 2,500 new and extra mailings of the survey forms

For these mailing actions a total of around 30,000 stamps was put on envelopes and paper with a weight of nearly 3 tons was handled.

The mailing was accompanied by around 2,000 first motivation calls by phone and over 2,000 reminder calls. Completing and correction calls were done with nearly 1,000 households.

The helpdesk offered by *Socialdata* received a total of about 250 phone calls. But it should be noted that all households with phone were rung up by *Socialdata* for motivating and clarifying reasons. This is one reason that the number of complaints remained quite low. Only three households were removed from the database on their own request.

The table below shows the response received from the respondents in Darlington.

The contract-specified net sample of 4,000 persons was exceeded by 7 %, and all responses were included in the data-processing without additional costs.

Response Table for Behavioural Travel Survey (Households)

	TOTAL	Households with telephone	Households without telephone
Mail-out Gross	4,100	1,900	2,200
Sample loss	699	259	440
Adjusted household gross	3,401	1,641	1,760
Returns households	**1,993**	**1,109**	**884**
Returns persons	**4,269**	**2,333**	**1,936**
Response rate in %	**59 %**	**68 %**	**50 %**
(Contracted persons)	(4,000)		

All the given facts prove that there was a high level of interest and willingness to participate in the survey amongst households in Darlington.

3.2 In-depth Survey

The in-depth research focused on a programme of face-to-face interviews, conducted in the home, with all household members over the age of 14. Specially trained staff from *Social-data's* Bristol office were responsible for making appointments for the interviews. The interviews themselves were prepared and organised in Darlington by two locally based field-managers. The interviews were carried out by locally hired and especially trained staff. The average duration of an interview was 50 minutes. For every second interview a field-control was made afterwards by phone checking the implementation, duration and number of household members involved.

Finally a total of 406 people in 257 households have been interviewed.

Response Table for In-Depth Survey (Persons)

	TOTAL
Gross sample	660
Sample loss	20
Adjusted gross sample	640
Returns	**406**
Response rate in %	**63 %**
(Contracted persons)	(400)